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AIR FORCE

and SPACE DIGEST

The Magazine of Aerospace Power / Published by the Air Force Association

AERO SPACE CHECK LIST

- *National Policy and World Affairs
- *Space and National Security
- *USAF—Today and Tomorrow
- *Aerospace Education
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PHILADELPHIA, PA., SEPTEMBER 20-24, 1961

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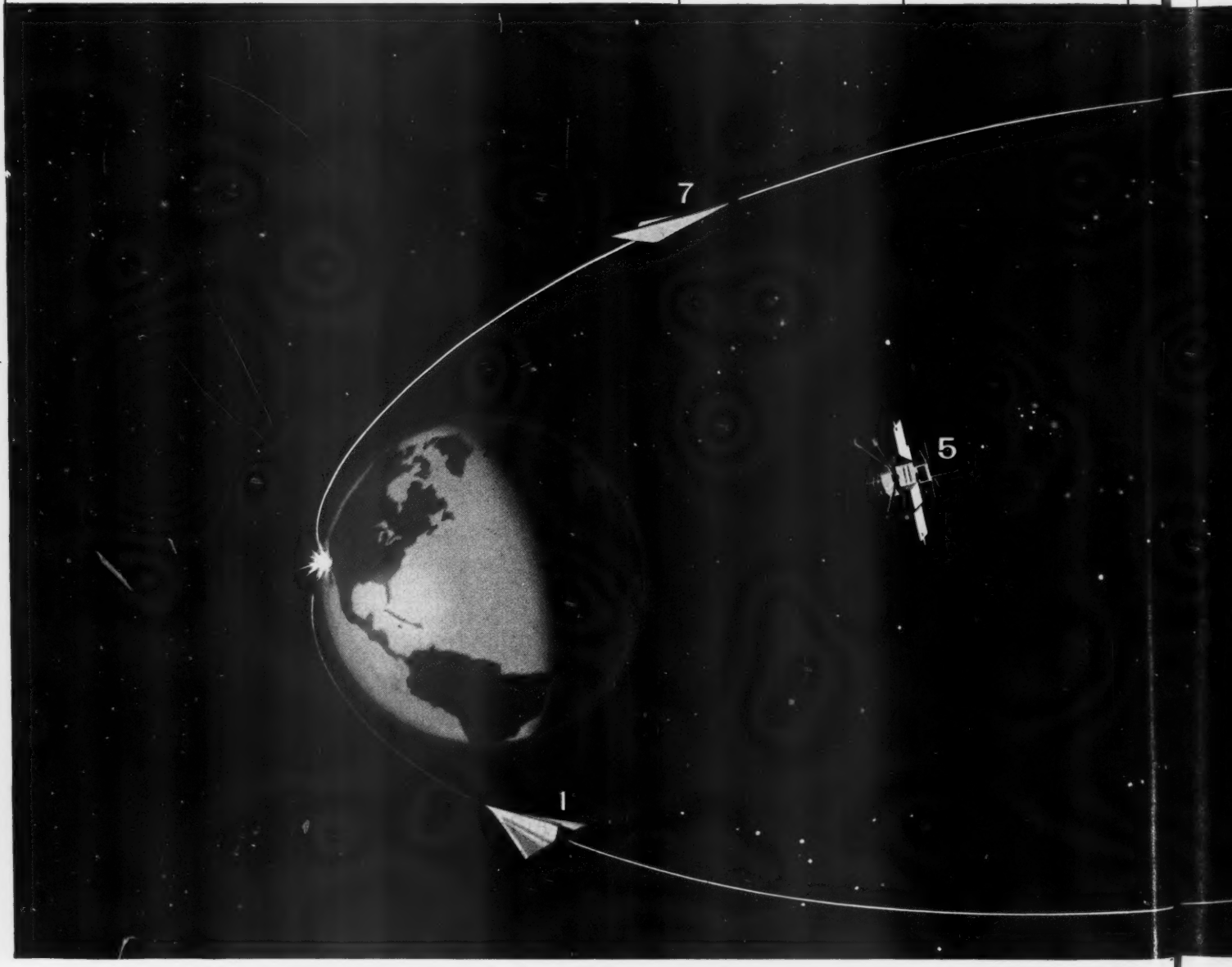
BENDIX COUNTDOWN FOR SPACE

7

PNEUMATIC CONTROLS: Hot gas equipment is being developed for space control subsystems using rotary and linear actuation, reaction jets, and pneumatic computation. A complete subsystem is now being built at E-P under USAF contract.

6

SELF-ADAPTIVE CONTROL SYSTEM: Capable of measuring dynamic sensitivities and adjusting feedback gains in stable fashion without sensing external environment. Automatically blends control of aerodynamic surfaces and reaction jets. Being developed under USAF contract.



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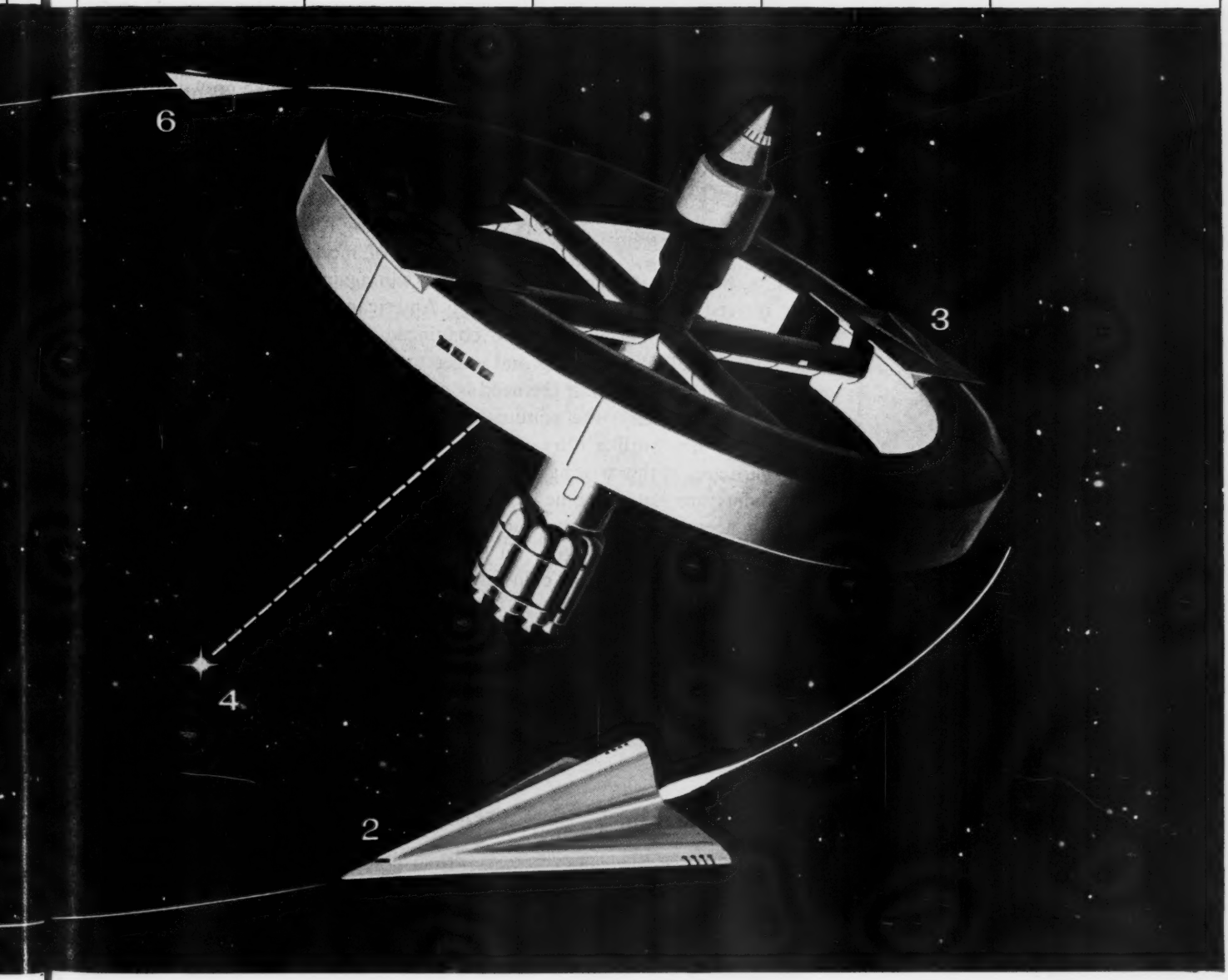
SATELLITE CONTROL AND STABILIZATION: Eclipse-Pioneer has total in-house capability for producing spacecraft attitude-control systems. In production: ADVENT reaction wheels. In development: sun-sensors and star trackers.	**STAR TRACKER SYSTEM:** A system incorporating multiple star tracking heads, designed to operate without a protective dome in the environment of space; digital readout accuracy of ±5 arc seconds.	**SPACECRAFT RENDEZVOUS COMPUTER:** Complete solid-state mechanization for analog and digital airborne computation of navigation, guidance, and altitude-control circuitry required at time of rendezvous. Digital computation at 10 megacycle rate.	**ADVANCED DISPLAYS AND CONTROLS:** Development currently in progress. Human-factor display studies directed toward rendezvous, re-entry, energy-management. Electronic and optical devices will present correlated data with minimum panel space.	**LETDOWN, APPROACH, LANDING:** Safer, more reliable letdown and landing systems—such as inertially augmented flare and runway-alignment, computers, advanced instrumentation (including real-time displays) —are now being developed, flight-tested.



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The Magazine of Aerospace Power / Published by the Air Force Association

AIR FORCE

and **SPACE DIGEST**

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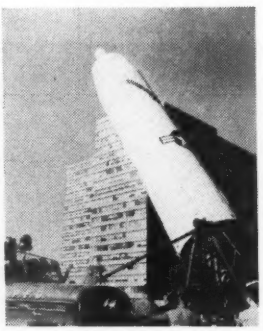

No Convention of the Air Force Association has ever met against a darker shadow of world events than did this year's meeting in Philadelphia. Truly, freedom's will to defend itself is being sorely tested as never before. The stakes of the struggle have grown cosmic. The Titan ICBM on display *(see cut)* in the City of Brotherly Love was a stark symbol of American determination, in President Kennedy's message to the Convention, to "respond to . . . challenges across a wide spectrum of military capability, taking full advantage of the flexibility and effectiveness of modern weaponry to deter aggression, but also, if necessary to fight and win against it." Other sobering words were uttered at the AFA meeting. The American people were described in the 1961 AFA Statement of Policy as "convinced . . . that Soviet aims are both evil and implacable" and "willing and eager to respond to whatever level of effort may be required of them, if the need is made truly clear . . . to work toward, and fight for if necessary, the elimination of communism from the world scene." These were not warlike utterances but the facing of facts.

There are, at this writing, ephemeral evidences, yet to be truly realized, that the Soviets are having some second thoughts about the potentially disastrous consequences of their current campaign against the West. And there are second thoughts in this country, too, on the semantics of such well worn phrases as "world opinion." These are cold but refreshing second thoughts.

We commend to your special attention the material in this issue chronicling the Air Force Association's Fifteenth Anniversary Convention and Aerospace Panorama. It is serious stuff for serious times. It is no exaggeration to suggest—as President Kennedy has done—that the events of the next several weeks and months may well determine the course of human history for centuries to come.

—W. L.

DEPARTMENTS

Airmail 12
What's New With Red Airpower 18
Aerospace World 20
Airpower in the News 28
Index to Advertisers 37
Tech Talk 115
Airman's Bookshelf 120
This Is AFA 128

VOLUME 44, NUMBER 11 • NOVEMBER 1961

Needed: A National Alert / AFA'S STATEMENT OF POLICY 8

Delegates to the Air Force Association's Fifteenth Anniversary National Convention at Philadelphia issued a ringing 1961-62 Statement of Policy calling for "a national alert—a new and higher level of national effort."

President Kennedy's Message to AFA 9

The President, in a letter to AFA at its Convention in Philadelphia, pledged the nation to a "fight-and-win" military capability.

National Convention 1961 / BY FREDERIC M. PHILIPS 39

AFA's Fifteenth Anniversary National Convention and Aerospace Panorama provided, once more, a major sounding board for the prime issues of free-world security and an impressive, educational display of hardware.

Progress Is a Variable / BY J. S. BUTZ, JR. 46

The variable-sweep wing, subject of a great deal of recent industrial research effort, may be the key to the aerodynamic future. It would provide aircraft and spacecraft optimum capabilities at a full range of speeds and altitudes.

"Nonprofits"—Prime Movers in the Space Age / BY CLAUDE WITZE 54

For more than a century, the government has been farming out complex research problems to nonprofit organizations able to do the job. Today, hundreds of these organizations have grown up to meet a vital need.

The US Air Force—Today and Tomorrow / BY THE HONORABLE EUGENE M. ZUCKERT 58

The Secretary of the Air Force declares that USAF provides national "reassurance" in an atmosphere of "nuclear blackmail."

"Aerospace Power Is Indivisible" / BY GEN. CURTIS E. LEMAY, USAF 62

The Chief of Staff calls for an end to excessive "command identification" within the Air Force. Externally, USAF is the strong right arm of the free world. Internally, it must maintain unity in order to meet its mammoth responsibilities.

SPACE DIGEST

Space and National Security / A SYMPOSIUM 71

The Threat Is Real / BY TREVOR GARDNER, SYMPOSIUM MODERATOR 72

A new and invigorated military space program is an urgent national necessity.

Peaceful Purposes: Some Realistic Definitions / BY DR. EDWARD C. WELSH 73

In a dangerous world, we must have space missions to help *keep* the peace as well as space missions to help us live better in peace.

Military Necessity: The Overriding Reason / BY DR. WALTER F. DORNBERGER 75

Space offers an opportunity for the Soviets to break the military stalemate. Realism requires us to face this fact of life.

Using *Our* Resources to the Fullest / BY REP. EMILIO Q. DADDARIO 77

In marshaling our resources for space programs, we must doggedly avoid duplication and splintering of talent and facilities.

Needed: Manned Operational Capability / BY GEN. BERNARD A. SCHRIEVER, USAF 79

Development of effective functional capabilities in the space arena will be a prime factor in the race for world leadership.

The Panelists Field Some Questions 81

How do we get on the road? . . . How much should we expand the military space budget? . . . Can we beat the Russians to the moon? . . . Is there a military man-in-space program now? . . . Is space really worthwhile?

Speaking of Space / BY WILLIAM LEAVITT 90

Vice President Lyndon B. Johnson, Chairman of the Space Council, takes a first-hand look at some of our national space bases.

Reserve Forces Featured at AFA Convention / THE READY ROOM 97

The key role of the Air Reserve Forces in bolstering US aerospace power drew major emphasis throughout the Convention. Prime Reserve events were a Reserve Forces Seminar and the Ricks aerial competition.

'61 Convention Called "Most Successful" / BY GUS DUDA 105

AFA News, in an organizational report on the Convention, observes that the Association "has come a long way since the first Convention, at Columbus, Ohio, in 1946."

Almost all military forces count their strength in sys

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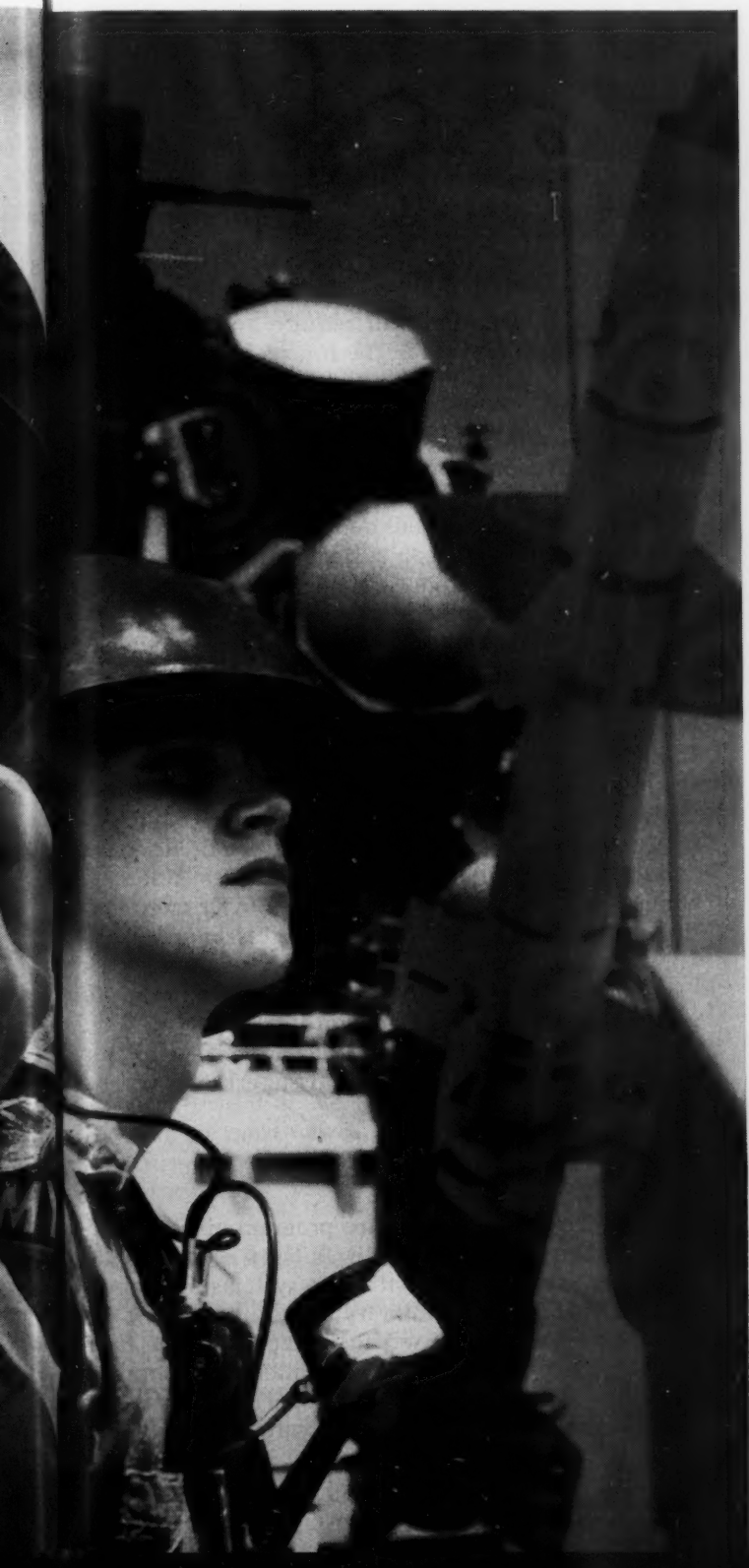

NEEDED: A NATIONAL ALERT

Following is the full text of the Air Force Association's 1961-62 Statement of Policy, as adopted by delegates to AFA's Fifteenth Annual Convention, in Philadelphia, Pa., September 21, 1961.

IN THIS, our fifteenth anniversary year, with the nation in grave peril, we respectfully acknowledge the heavy responsibility that weighs upon our new Commander in Chief—a burden that is his alone. And we are well aware that it is far easier to advise than to decide.

Nevertheless, we would be remiss in our duty as Americans were we not to state, particularly at this time, our deeply held beliefs, our aims, and our objectives. We offer them here, together with our pledge of personal effort and sacrifice to achieve them, in this 1961 Statement of Policy of the Air Force Association.

Power Equation

If the record of forty years of oppression, aggression, deceit, and duplicity had not already done so, events of the past several weeks have made it abundantly clear that the Soviet system—regardless of what form it may take at any given time in any given part of the world—is incompatible with the existence of freedom.

The cloak of coexistence no longer conceals Soviet aims. Communist intent and Communist power stand naked before the world. We must face the Soviet system with the only force it understands and respects—even stronger power, accompanied by the avowed determination to use this power if and when it is needed.

Freedom or Communism

Mankind cannot exist indefinitely in a world that remains half slave and half free. Preservation of the *status quo* is not adequate as a national goal. Freedom must bury communism or be buried by communism.

Complete eradication of the Soviet system must be our national goal—our obligation to all free people—our promise of hope to all who are not free.

National Alert

To attain the level of national power needed in this crusade, the energies and talents of the American people must be mobilized on new terms. We therefore petition the President to declare a National Alert—a new and higher level of national effort.

Such a declaration would establish a basis on which to build and maintain the power we need. It would make clear to the Soviets and to the world that we are determined to back our words with action, even at the risk of war—that we seek not merely to preserve our freedoms but to extend them.

A Credible Deterrent

The overriding priority of the day must be the unquestioned credibility of our nuclear deterrent. This credibility has been undermined by Soviet confidence in its own rising strength and by Soviet belief that the United States is unwilling to engage in nuclear war in behalf of freedom.

Military Programs

A credible deterrent will require accelerated military programs now and in the future. We consider the following to be basic:

- Greater survivability for our striking forces.
- Airborne alert for a substantial portion of the Strategic Air Command.
- Expansion of our manned-bomber programs, including rapid development and production of the B-70 as a high-priority weapon system.
- Acceleration of our strategic missile programs in terms of numbers and effectiveness.
- Improved intelligence and reconnaissance systems, both aeronautical and spaceborne, to obtain more information on Soviet capabilities and intentions, and to guard against surprise nuclear attack.
- Greater reliability and survivability of the national command and control system, to reduce the chances of war by error, and to ensure immediate, effective, and sustained employment of our forces.
- Equipping of our aerospace defense system to counter the full spectrum of the Soviet aerospace threat as evidenced by Soviet progress in supersonic bombers, missiles, and manned spaceborne systems.
- Increase of our ability to deter or promptly prevail in situations short of general war.
- Accelerated research and development efforts to attain and maintain technological superiority in areas of our choice.

National Space Program

Currently, our national space program gives priority to nonmilitary applications. It fails to recognize the important contributions that space systems must make to the extension of our military capability. This faulty emphasis must be reversed to utilize US space technology as a prime factor in the international power equation. All phases of the national space program must *first* be measured against the yardstick of national security needs.

Nuclear Employment

National policy must make it abundantly clear that the United States will not hesitate to employ its nuclear strength in response to Soviet aggression—whether that aggression takes the form of nuclear attack, nonnuclear attack, nuclear blackmail, aggression by Soviet satellite nations, infiltration, or subversion—should the military situation dictate that use of nuclear weapons is in the best interest of the United States.

National policy must prescribe that the choice between nuclear and nonnuclear weapons is neither moral nor political but is essentially a military consideration. If this principle is not recognized as national policy and firmly enunciated to the world, we are seriously compromising the effectiveness of our nuclear arsenal and thus increasing the danger of general conflict.

Survival of the People

The national alert program must also ensure the survival of the majority of the American people and the survival of viable government machinery in the event of general war. Needed measures include protection of individuals, military and civilian, against blast, heat, and radiation—including fallout. They must provide for reestablishment of the national social and economic fabric following a general war.

The Only Insurance

The ability to fight, win, and purposefully survive a general nuclear war provides the best, indeed the only, insurance against such an eventuality. We must be willing and able to risk war, and make sure that both our willingness and ability are firmly implanted in the minds of the Soviet leaders. Only from such a position can we then apply economic, diplomatic, technological, and other pressures against the Soviets.

To those who say that today such a position cannot be sustained, that deterrent credibility cannot be achieved, that it deteriorates into a stalemate of bluff —to these arguments we reply: "Your stalemate philosophy is a philosophy of despair and defeat. Its acceptance by the United States would, in itself, break the 'stalemate' in a psychological sense—and in favor of the Soviets. World leadership would automatically revert to the loudest rocket-rattler. Initiative would pass to the aggressor."

The President has said, "We must never negotiate through fear. But we must never fear to negotiate." In turn, we must never fear to *refuse* to negotiate that which is *not* negotiable. We must never compromise basic principles. We must never appease.

Technological Realities

The stalemate philosophy ignores the realities of technological progress. The advent of nuclear weapons has changed the international power equation. But technology also can wipe out equations and write new ones. It has done so in the past.

There is no reason to believe that nuclear weapons, no matter how they may increase in numbers and ferocity, mark the end of the line in military systems development. New weapons, more selective in application and less destructive of life and property, may come into being. Their possession by one side and not the other could surely break a nuclear stalemate in a dramatic fashion. Thus, the search for new and advanced systems must have a high priority in our military research and development effort.

The People Are Ready

We believe that events in this fall of 1961 have convinced the American people, if any were unconvinced before, that Soviet aims are both evil and implacable. We believe the people are willing and eager to respond to whatever level of effort may be required of them, if the need is made truly clear. We are convinced that the people are ready to work toward, and fight for if necessary, the elimination of communism from the world scene.

Let the issue be joined.—END

PRESIDENT KENNEDY'S MESSAGE TO AFA

THE WHITE HOUSE

September 15, 1961

Dear Mr. Stack:

While it will not be possible for me to be present, please convey my warm greetings to all attending the Fifteenth Annual Convention of the Air Force Association, and assure them of my deep interest in the proceedings. The subjects under discussion are of major significance in helping to safeguard our ideals and way of life in this age of international tension and change.

I know that many members of the Association, veterans of earlier service to our country, meet this year in the full knowledge that their services may be required again. I am confident that, if the need should arise, they will respond in the same spirit of devotion to national security and international justice that has moved the Air Force Association since its inception a decade and a half ago as a citizens' organization dedicated to adequate airpower as a necessary adjunct to world peace and national survival.

In the years that have passed since your founding, airpower has become aerospace power and both its capabilities and responsibilities have taken a quantum jump. Technology has shrunk the world while the ferocity of modern weapons has multiplied manifold. The forces of nature, unleashed by scientific progress, unfortunately know no ideology. They serve those who would enslave the world as well as those who would make it free.

Thus we face, in the short run and the long, a wide range of military and diplomatic challenges by a strong and determined adversary. We must be prepared to respond to these challenges across a wide spectrum of military capability, taking full advantage of the flexibility and effectiveness of modern weaponry to deter aggression, but also, if necessary, to fight and win against it. In this great effort our Air Force will, as it has in the past, play a vital role.

This is the basis of our military doctrine in a difficult decade and I welcome the continued support of the Air Force Association in the strengthening of the forces required to achieve it.

Sincerely yours,
JOHN F. KENNEDY

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Realistic Reminder

Gentlemen: Your editorial, "Power vs. Popularity" (September '61 issue), was very hard-hitting, powerful, and *realistic*. Today the American people tend to forget our free, proud, and honorable heritage. Your editorial serves to charge us with our tremendous responsibility to our forefathers.

Bravo!

ROY I. SMITH
Newark, N. J.

Puncture of a Dream

Gentlemen: I have just read "Airpower in the News" in your October issue and think it is great. I had not seen General Kuter's speech on the vital necessity of defending our country, if we have to, with nuclear weapons. It makes a very good point.

Mr. McNamara's testimony demonstrates the weakness of will in the use of atomic weapons which now permeates all policy. Of course, the biggest issue today is not Berlin or Laos or any other little spot. It is the question of whether the leaders of the United States have lost the nerve to use atomic weapons where we have to use them to avoid defeat.

The phony baloney now being served up by a combination of pacifists, professors, intellectuals, and ignoramuses to the effect that we can win any war anywhere with a few more Army troops is still allowed to go unchallenged.

Only General Norstad, General Kuter, and a few bold spirits are resisting the Bonesteel-Taylor fairy tale that was so completely rejected for several years and now is so unquestioningly accepted.

Your article punctures this GI dream in the spot where it is thinnest. I hope you will keep up the good work.

(Name withheld)

Command Coverage

Gentlemen: Many thanks for the 1961 Almanac issue of AIR FORCE/SPACE DIGEST. We were very pleased to see the fine play given the Air Force Academy in your comprehensive coverage of the Air Force major commands.

This annual special issue is already being used to advantage by many Academy personnel and should serve as valuable reference material for the Cadets in their military studies.

COL. HOWARD J. WITHYCOMBE
Chief of Staff
United States Air Force Academy
Colorado

Gentlemen: . . . As Commander of Air University I extend congratulations to you and your staff for this fine and very informative issue [September 1961] and, particularly, for the excellent coverage given Air University.

Best wishes for continued success of your publication.

LT. GEN. TROUP MILLER, JR., CMDR.
Air University
Maxwell AFB, Ala.

In the Pursuit of Accuracy

Gentlemen: I would like to compliment you on the general excellence of your 1961 Air Force Almanac. I find it a highly valuable and ready source of information. However, I would like to point out a couple of errors in subject matter and photographs which may have already been brought to your attention.

First, in your "Guide to Air Force Bases," pp. 213-221, Myrtle Beach AFB and Seymour Johnson AFB are listed as Ninth Air Force bases. These two bases have been a part of Twelfth Air Force since July 1, 1960. Second, the aircraft identified as a C-119 on page 232 is a C-82. In fact, it is the same C-82 pictured in an old *Aircraft Recognition Manual*, AFM 50-40, published in May 1949.

WILLIAM C. LEWIS
Hq. Twelfth Air Force
Waco, Tex.

Gentlemen: Apparently there have been no recent revisions to "Releasable Information on US Air Force Aerospace Craft" because the same incorrect facts that appeared in the January '61 issue re the Douglas C-124 now appear in the September issue, the only difference being the page number. I am not trying for equal time or anything, but your letter to me dated February 27 connoted an intention to preclude repeating the error.

I seriously doubt that you will have time to (1) answer this or (2) publish evidence of my dogged persistence, because I think you will be too preoccupied with mail from former "$1.19 pilots" who are writing to say that the photograph on page 232 should be

Above, the now properly identified C-82. Below, our old friend, the '119.

recaptioned "C-82." Incidentally, I admit that the profiles are remarkably similar, but AFA's vernacular was "considerably modified," thus the stimulus to respond.

May I suggest something? If your periodic receipt of crank letters gets too cumbersome, you might consider hiring someone with a little practical experience to do a little proofreading. Make me an offer. . . .

Seriously, the function of a military market analyst demands a high degree of knowledgeability about the customer. This your magazine eminently provides. Again, kudos.

A. C. MENADIER
Burlington, Vt.

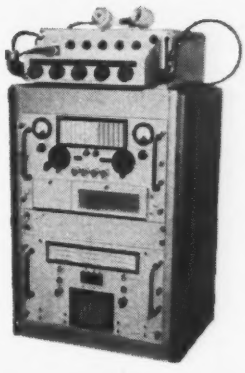
● *How agreeable to get what appears to be fast becoming your semi-annual report to the Board of Corrections* ("Air Mail," April 1961, page 12). *And pleasant for us to be able to fire back at you that you're wrong on two counts—(1) we are answering your letter; and (2) we are publishing "evidence of [your] dogged persistence."*

On the first matter, we don't use "Releasable Information" any more.

(Continued on page 15)

Faster, surer single sideband communications at vital Atlas, Titan, Minuteman missile sites

The United States Air Force is now taking delivery of SC-900 Series fully automatic 1KW single sideband transceivers developed and manufactured by General Dynamics/Electronics. This equipment will be installed at ATLAS, TITAN and MINUTEMAN missile sites and represents, in the truest sense, a real step ahead in the state of the art of communications. All tuning of the new General Dynamics/Electronics single sideband equipment is digital ■ The use of broadband techniques rather than a servo system results in faster tuning, simplicity and increased reliability ■ Emphasis on linearity, wide dynamic range and selectivity in the receiver RF circuits reduces interference from any nearby communications equipment to an absolute minimum ■ Self-contained noise blanker eliminates interference from pulse type noise without the need for a separate noise sensing antenna ■ Functional modular construction offers the maximum in ease of maintenance ■ And in addition to all of these operating advantages, General Dynamics/Electronics single sideband equipment is extremely compact, ideal for a wide range of portable and stationary communications applications.



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GENERAL DYNAMICS | ELECTRONICS

How to show the sky in stereo

Up till now, radar has literally been blind in one eye. It lacked one of the prime dimensions—depth perception. Conventional radar could only show objects in two dimensions. Either direction and distance *or* height and distance.

This limitation often makes radar lag behind the pace of modern aircraft—forcing planes to slow down in the busy intersections over airport areas.

But now the other eye has been opened. Hughes' new 3-dimensional—or stereoscopic—radar presents a scaled-down "cylinder of sky." Watching this radar, you could see the earth, the air space above and aircraft represented with a definition never before possible. The result: planes could move through busy intersections with new speed and safety.

This new radar display console—called Stereoscan—has two Hughes Tonotron* picture tubes which are combined to make this startling 3-dimensional view possible. Because they remember images—they produce a radar picture where the "blips" leave contrails like a jet. It is these patterns that clearly show the direction *and* altitude *and* distance which separates the planes.

This improved radar display is also more accurate, easier to view and can be used under normal room lighting.

Electronics is our business. A Stereoscan console, operating with service proven Hughes 3-D radar, has shown its potential at the Hughes, Fullerton, California facility. It is one more example of Hughes' ability to break ground in science—both for commercial and defense purposes.

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY

We've come to the conclusion "Releasable information" was based on bravado.

You're right about the photo of the C-119. And we're running photos of both aircraft just to set the record straight.

Here are miscellaneous other errata:

Page 27, column 2: "Mr. Lang, a North Carolinian," did not *succeed Ben Fridge as Deputy AF Secretary for Reserve and ROTC Affairs. He succeeded William P. Wright, Jr., who had succeeded Fridge.*

Page 160: AF Special Weapons Center is not *at Holloman AFB; it's at Kirtland.*

Page 218: Kirtland AFB is not *"to be turned over to the city of Albuquerque." The city will have use of certain facilities and runways, but will not control the base itself.*—THE EDITORS

Flight Pay Response

Gentlemen: I want to add a "third and fourth of all" to your "first and second of all" reply to the "Flying Goldbrick" letter by Mack Harbin in "Airmail," September 1961.

Third of all, Mr. Harbin, that your employer does not award you hazard pay suggests that he recognizes the difference between an aircrew member and a passenger, as well as the difference between military and commercial aircraft. Would you in honesty say that the difference in pay between an airline pilot and that of any other commercial vehicle operator is strictly a measure of skill? Or is it perhaps associated with the fact that his life insurance rates are higher?

Fourth of all, your statement that "a ride in an ordinary military aircraft is no more hazardous than a ride in a commercial airliner," cannot be supported factually on a basis of comparable aircraft, passenger miles, aircraft miles, or any other comparison I know of. Pictorially listed in the same issue were the ordinary aircraft of today's Air Force: bombers, transports, and fighters. The purpose of these aircraft is not a peaceful one, and the practice missions to ensure technical proficiency frequently lack only the hazard of a retaliating enemy action. Aircrews of today's ordinary military aircraft are presently performing hazard duty. The job for which they prepare "tomorrow" transcends any form of recompense. The manner in which they perform and the moral and physical support they receive will in the very near future determine whether you and yours remain in the publicity business of a free world, or of any world. That you and your employer do not recognize the fact is not unusual. It is poignantly painful at a time when flying personnel of World War II and Korea require a reservoir of dedicated youngsters to fill their boots and fulfill your future that we "pooh-pooh" the risk, chop the pay, reduce fringe benefits, and ironically increase the old-age pension to civilian beneficiaries who may never live to claim it in US currency.

Note to the Editors: It is additionally ironic that one-time soldiers recalling the high points of their military service when they hitchhiked on leave via military aircraft did not recognize the whole picture. The planes they weren't permitted to board were the "ordinary aircraft." The planes they rode were the old tried and true clunkers—the C-45s, C-47s, and B-25s—which when lacking cargo or legitimate passengers obliged these people at government expense.

This may be the basis of the imaginative indignation of many a Mr. Harbin. I feel that your failure to represent such facts as you could marshal is a distinct disservice. You "first of all" imply an inequity when you apologetically proffer that the number eligible for flight pay is being reduced. "Second of all," you state that the system, while wrong, is better than none. Your lack of familiarity with the average aircrew member, his motivation and make-up, shows through. He is, in fact, already underpaid, as you well know, yet he sticks to his job through a dedication that for many is difficult to comprehend. Do you now advocate cutting out his flying pay and if so, can you arrange to reduce his life insurance premiums to the level of your own? The answers you have tossed back at Mr. Harbin are oft repeated, misleading, and rather lacking in perspicacity.

LT. COL. E. R. BALLINGER
Los Alamos, N. M.

● *There was no apologetic intent in pointing out that the number of people on flying status is being reduced. Flight pay should not be a substitute for pay that needed people, whose jobs no longer require flying, should be getting to keep them in the service. Nor do we feel any lack of familiarity with the motivation of the average aircrew member. He deserves his flight pay and more. Needless to say, we had no intention of kissing off Mr. Harbin with our Editor's note, and probably would have been of greater service had we gone into the matter at greater length, along the lines of Colonel Ballinger's retort. So we'll take our lumps along with Mr. Harbin.* —THE EDITORS

Hughes 3-D radar display console can give a continuous view of sky activity. Integrated with a complete control system, it would tell air traffic controllers if planes were on a collision course. They could make swift decisions and direct air traffic in a fraction of the time it takes today.

**Trademark Hughes Aircraft Company*

Westinghouse Electric Power System S

Electric power is the lifeblood of flight vehicles.

Instrumentation, control, guidance and navigation, communication, human comfort—indeed virtually every function in every modern transport, military or civil aircraft, missile or space vehicle depends on an electric power system.

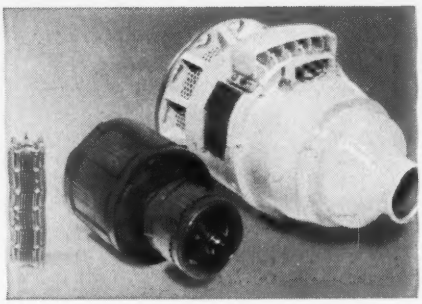
For many years Westinghouse has specialized in the design and production of such systems. These have ranged from wind-powered generators of World War I aircraft to today's superb brushless generators and static control equipment.

Headquarters for this important activity is the Westinghouse *Aerospace Electrical Department* at Lima, Ohio.

Here more than 1600 skilled men and women design, develop and produce airborne electrical equipment which has achieved an unrivaled record of trouble free service.

Here, too, skilled scientists and engineers are working on new systems to meet electrical requirements of flight in years to come. This work is directed by R. W. Esarey, AED manager (left seated), A. L. Paquette, marketing manager (seated), J. D. Miner, engineering manager, and F. W. Lowry (right standing), manager of advanced systems applications.

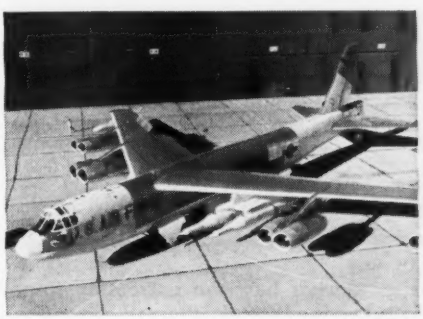
One of the most successful flight proved electric power systems ever built consists of 30 and 40 KVA brushless generators and static control apparatus for the Boeing commercial Jetliners. Mean time between removals is in thousands of hours — a dependability record many times better than that of ordinary brush-type generators.



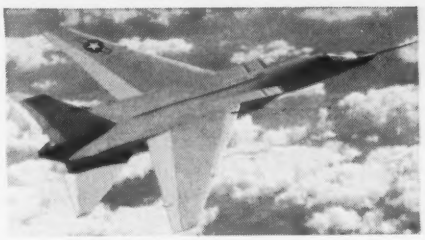
Longer service life and greater reliability results from the elimination of commutators, carbon brushes, and collector rings. These are replaced by a single rectifier stack consisting of high-temperature silicon diodes. Westinghouse research in semiconductors made this important advance possible. Results: greater reliability, increased TBO, reduced maintenance costs.

Serve the Advancing Needs of Flight

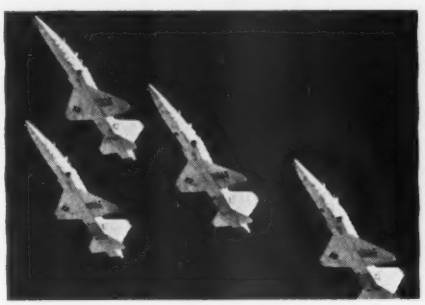
Westinghouse brushless generators are standard on Boeing 707s and 720s. The coming 3-engine Boeing 727, above, will have a new Westinghouse starter-generator system using the basic, time-proved brushless design.



The largest rated brushless air-cooled generators ever produced supply electric power for the Air Force B-52H, built by Boeing. These Westinghouse generators are rated at 120 KVA.



Oil-cooled brushless generators are provided for two major high-performance military aircraft, the Air Force B-58 "Hustler," built by Convair, and the Navy A3J, built by North American Aviation.



Another military aircraft, the sleek Air Force T-38 Jet Trainer, built by Northrop, is equipped with Westinghouse 8 KVA brushless generators.

Space electric power systems also are a major activity at Westinghouse. The Air Force manned space glider, Dyna-Soar, to be built by Boeing, will have a new brushless generator and static control equipment to supply vital electric power.

For the future, thermoelectric, thermionic, solar cells of high efficiency, magnetohydrodynamic and other advanced systems are being developed to provide electric power for space as well as non-space applications.

You can be sure . . . if it's

Westinghouse

J-61139

What's New With ★ RED AIRPOWER

Here's a summary of the latest available information on Soviet air intelligence. Because of the nature of this material, we are not able to disclose our sources, nor document the information beyond assurance that the sources are trustworthy.

One of the major surprises at the Moscow air show on Red Air Force Day this summer was the large compound helicopter shown at the right, which has been given the NATO code-name Hoop.

Many Western observers have attributed very advanced, almost miraculous, performance to this aircraft. Some segments of the US aviation press have pointed to the Hoop as a positive sign that the Soviets did not abandon the development of VTOL airplanes, as many Russian aviation authorities have hinted. Publicly, Soviet designers have expressed many doubts about the practicality of VTOL airplanes during the next ten to fifteen years. When it comes to vertical takeoff and landing, they have strongly favored the pure helicopter and the helicopter with stub wings such as the MI-6. The Russian position has seemed to be that the proper engines are not yet available to make tilt-wing and other types of high-speed VTOL airplanes practical.

For this reason, it was surprising to many when the Russians showed the Hoop, a compound helicopter, closely related to England's Fairey Rotodyne and the McDonnell XV-1, US research airplane. On all three of these aircraft a large rotor provides direct lift for a helicopterlike vertical takeoff and landing. During cruise, when the rotor is relatively inefficient, it is "unloaded" and no longer provides lift and forward thrust. Lift is then developed by a small wing and engine power is transferred from the rotor to conventional propellers for propulsive thrust. The compound helicopter's main advantage is a cruise speed potential of better than 250 mph compared to about 175 mph for the pure helicopter.

An analysis of the estimated performance of the Hoop indicates that the Russian designers may not have been kidding when they were pessimistic over VTOL aircraft in this decade. This analysis also raises the possibility that some Western observers may have misinterpreted the Hoop's place in the Soviet scheme of things.

All available data indicates that the Hoop is primarily a STOL or short-takeoff-and-landing aircraft. It could be used on VTOL missions, but its payload would be extremely low.

Actually the Hoop configuration shown in Moscow is a woefully underpowered design, probably intended solely as a flying testbed for the compound helicopter concept. Even if its engine power were doubled this aircraft would be used primarily for STOL flight. With doubled power it probably still would not be able to lift half of its normal payload in vertical flight.

The best means of predicting the Hoop's performance is to compare the estimated data for the airplane with the specifications of the Fairey Rotodyne and with the results of studies made in the US by the National Aeronautics and Space Administration.

The Hoop's two gas turbine powerplants are widely reported to develop 4,000 eshp each, and they do appear to be about the size of the 4,000 equivalent shaft horsepower engines in the IL-18 and the AN-10 transports. Its very large body, almost 100 feet long, is believed to be a modified AN-10 fuselage. This apparently has led to press reports that it can carry 100 passengers.

Such reports are highly unlikely. The Rotodyne, for instance, has an installed power of about 10,500 eshp and can carry a maximum of sixty to sixty-five passengers. Virtually all Western observers consider the Rotodyne to be up with the state of the art, and it is improbable that anyone today could build a compound helicopter to lift 100 people with 8,000 eshp as claimed for the Hoop.

NASA has produced some paper designs, using the latest research information, which are slightly better than the Rotodyne in some departments, but still do not come close to the performance claimed for the Hoop. One typical NASA study describes a forty-passenger compound helicopter, weighing 50,000 pounds, which has a total power of 12,000 eshp. This aircraft has more power and less payload than the Rotodyne, but it has a range of more than 900 miles against about 700 miles for the Rotodyne. Its cruise speed also is forty-five mph faster than the Rotodyne's.

Kamov's Hoop, compound helicopter, flying near Moscow.

The NASA paper design has one extremely important feature in common with all high-payload-capacity compound helicopters—if the aircraft loses an engine it cannot hover or rise vertically, if it is more than about fifteen feet above the ground. For the sake of safety this paper design, when it carried a full load of forty passengers, would operate as a STOL using a field length of about 1,000 feet to prevent a crash if one engine failed on takeoff.

Using the NASA studies as a base of comparison, the Hoop's maximum payload for a vertical takeoff probably would be about fifteen to twenty passengers if a full fuel load were carried. If an engine failed on takeoff the aircraft would drop back to the ground. For STOL operations on fields up to 1,500 feet the aircraft probably could carry fifty men, but it would still be in trouble if an engine failed at the critical time on takeoff.

If the Hoop's power were increased to a total of 12,000 eshp or so, the engine-out danger probably could be eliminated without compromising performance.

Some US experts feel that the Hoop is an early Soviet attempt at the compound helicopter. Certainly they could improve on its current performance to provide the Red Army with a true, low-landing-speed STOL transport capable of operating from virtually any open space.—END

FULL SPEED AHEAD WITH THE BENDIX G-20 COMPUTER SYSTEM

The old nautical term has a new computing significance, thanks to the over-all system speed of the BENDIX G-20. Here is a modern, solid-state computing system whose high speed is not limited by input/output operations.

Blending high computational speeds with high input-output and transfer rates, the G-20 eliminates data handling bottlenecks . . . allows through-put (the full input-compute-output cycle) to occur at the maximum speeds of all system components. Magnetic tape transfer occurs, for instance, at 120,000 8-bit characters per second—search is performed at twice that speed. Double transition recording, high packing density, and the elimination of tape skew errors with a unique deskewing buffer provide unmatched tape system speed and reliability.

Helping the magnetic tape units assure input/output to match main frame speed is the BENDIX Data Communicator, allowing simultaneous transfer of data over as many as four channels at 120,000 characters per second each. This simultaneous capability—plus the rapid tape transfer rate—cuts conventional sorting and file maintenance times in half . . . provides an effective transfer rate of 480,000 characters per second.

That's why, with the Bendix G-20, your scientific, engineering, or business data processing can move "full speed ahead." Investigate the capabilities of the proven G-20 computer. Write for Bulletin BSP-05611.

Bendix Computer Division
DEPT. BB-36. LOS ANGELES 45, CALIFORNIA

THE Bendix CORPORATION

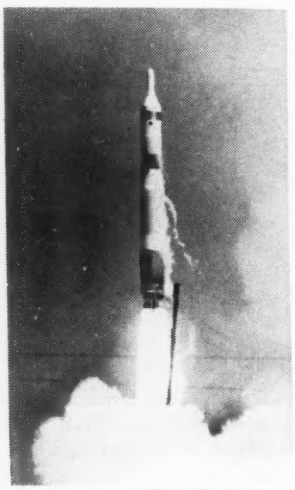
News,
Views
& Comments

AEROSPACE WORLD

Frederic M. Philips
ASSOCIATE EDITOR, AIR FORCE MAGAZINE

Two big birds flew the coop. The X-15 set another record. A new joint command was born. Retirement came to two old soldiers. And the lady kept right on rolling—or zooming—along.

These were at the top of the aerospace news in a month characterized by continued Berlin crisis, Russian contamination of the atmosphere with nuclear test after nuclear test, fresh uneasiness over world trouble spots from Latin America to Africa to Southeast Asia, and call-up of a substantial number of US military reserves.



—Wide World Photos

Titan ICBM was launched for first time from combat launch site in September.

—Wide World Photos

USAF Maj. Bob White climbs from X-15 after taking plane to record altitude of 215,000 feet or about forty miles on October 11, cracking previous high of thirty-two miles set by Joe Walker, NASA's X-15 aviator. Pilot Walker on September 12 had set speed mark of 3,645 miles.

★ USAF Maj. Bob White took the X-15 up forty long miles on October 11. This broke the former altitude mark of thirty-two miles set by X-15 test pilot Joe Walker of the National Aeronautics and Space Administration back on March 30. Major White, honored with Walker and North American Aviation's X-15 pilot Scott Crossfield at the AFA Convention in Philadelphia, flew his little rocket ship to 215,000 feet. At that altitude, he was above ninety-eight percent of the earth's atmosphere. The flight was not without incident; at one point on the way back down, Major White radioed, "The outside windshield on the left side just shattered. There are little pieces of glass flaking around." The X-15 has an outside and inside windshield with air in between. Major White's heartbeat and respiration rates also doubled on the flight. It was the second X-15 mark set during the month. Joe Walker sped to 3,645 miles an hour on September 12, topping White's record of 3,603 mph set in June.

★ On September 23, a Titan missile was fired at Vandenberg AFB, Calif., after rising from its 146-foot-deep underground silo. The missile was fired downrange some 4,500 miles to a prearranged target site near Wake Island. It was the first firing of a Titan from an operational-type armored combat launch site—in which the missile is raised prior to firing. The Air Force said it was "extremely happy with the entire test." The Martin-manufactured missile had three other outings in the month. On October 6, at the Cape, it went 5,000 miles across the Atlantic to a target site off the coast of Africa, for the thirty-first successful go in forty-one Titan shots. The missile carried an advanced guidance system, scheduled for use aboard the Titan II, second version of the Titan. The "II" is expected to have its first flight test in the next few months. A month earlier, in one-two blastoffs, Titans were launched on September 6 and 7. The September 7 shot went a total of 6,100 miles.

★ Another long-distance Atlas shot was recorded on October 5. The big missile rumbled some 9,000 miles from the Cape to the Indian Ocean just as three other Atlases had done in the past. This one fell a trifle short of the marks set by the others—one traveling 9,054 miles, the other two about 9,040. This latest had a heavier nose cone. A major goal of this shot was a test of nose-cone materials. Three days earlier, on October 2, another Atlas, an E model, went 5,000 miles over the Atlantic. Early the previous month, on September 8, another Atlas attempt at the Cape fizzled. Its sustainer en-

Victors at SAC 1961 Combat Competition at Fairchild AFB, Wash. Left, crew members, commanders of 4137th Strategic Wing B-52s that won Fairchild bombing-navigation trophy. Rear row at left, division commander Brig. Gen. J. J. Catton, wing commander Col. R. C. Neeley, aircraft commander Capt. A. M. Coleman. Front row, far left, aircraft commander Capt. H. J. Dease. Right photo, winners of top-tanker-unit trophy, crew of one of two winning KC-135s of 915th Air Refueling Squadron.

gine cut off too soon and the missile fell into the Atlantic after a several-hundred-mile flight.

Meanwhile, Atlas bases that will provide at least some protection against thermonuclear blast moved toward completion. Completion of semihardened bases at Spokane, Wash., and Topeka, Kan., were scheduled to give the United States nearly forty-five Atlas missiles officially in operational status.

★ Announcement came on September 19 that "forces of the Strategic Army Corps (STRAC) and the Tactical Air Command (TAC)" were to be combined to form a new unified command. Specified to head the new force was Lt. Gen. Paul Dewitt Adams, commanding general of the Third Army at Fort McPherson, Ga. In mid-October, the Defense Department named the new joint outfit the "United States Strike Command" and designated MacDill AFB, Fla., until now a SAC B-47 base, as temporary headquarters for the new TAC-STRAC limited-war combination.

Its aim was given specifically as provision of "combat-ready land and tactical air forces which can be rapidly moved when required to augment US forces already deployed or to carry out such contingency missions as may be assigned by the Secretary of Defense or the Joint Chiefs of Staff."

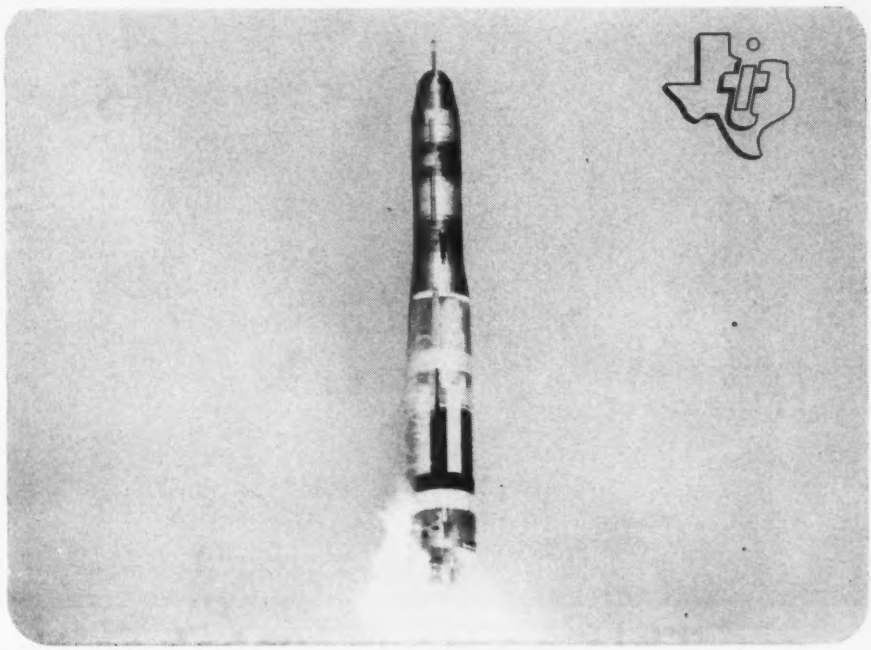
"The new unified command," the Department of Defense said, "will develop doctrine for the integrated employment of the land and tactical air forces assigned and will be responsible for the training necessary to weld these forces into an efficient air-land team."

This was an extremely important step. Exactly what it would mean in terms of US armed forces hardware, personnel, and war-readiness remained for the future to reveal. Immediate plans for establishment of the new outfit also were unstated by DoD, except for the assertion that "the new command will be formally established before the end of the year, after completion of studies by the Joint Chiefs of Staff on detailed force structure and other arrangements." (*For more on this subject, see "Airpower in the News," page 28.*)

★ New Commanders took over two major commands this month. For the Tactical Air Command, now a principal in the setting up of a joint force with STRAC, Gen. Walter C. Sweeney, Jr., succeeded Gen. Frank F. Everest on September 29. General Everest had been TAC commander since 1959. His retirement brought to an end a military career that began with graduation from the Military Academy in 1928. General Everest served in the South Pacific during the second World War, commanded the Fifth Air Force in Korea in 1951 and 1952, headed the US Air Forces in Europe prior to TAC command.

General Sweeney, the new TAC commander, is a 1930 graduate of the Military Academy whose last assignment was as commander of SAC's Eighth Air Force at Westover AFB, Mass. He served in the Pacific in World War II, has seen SAC duty through most of the years since.

(Continued on page 23)

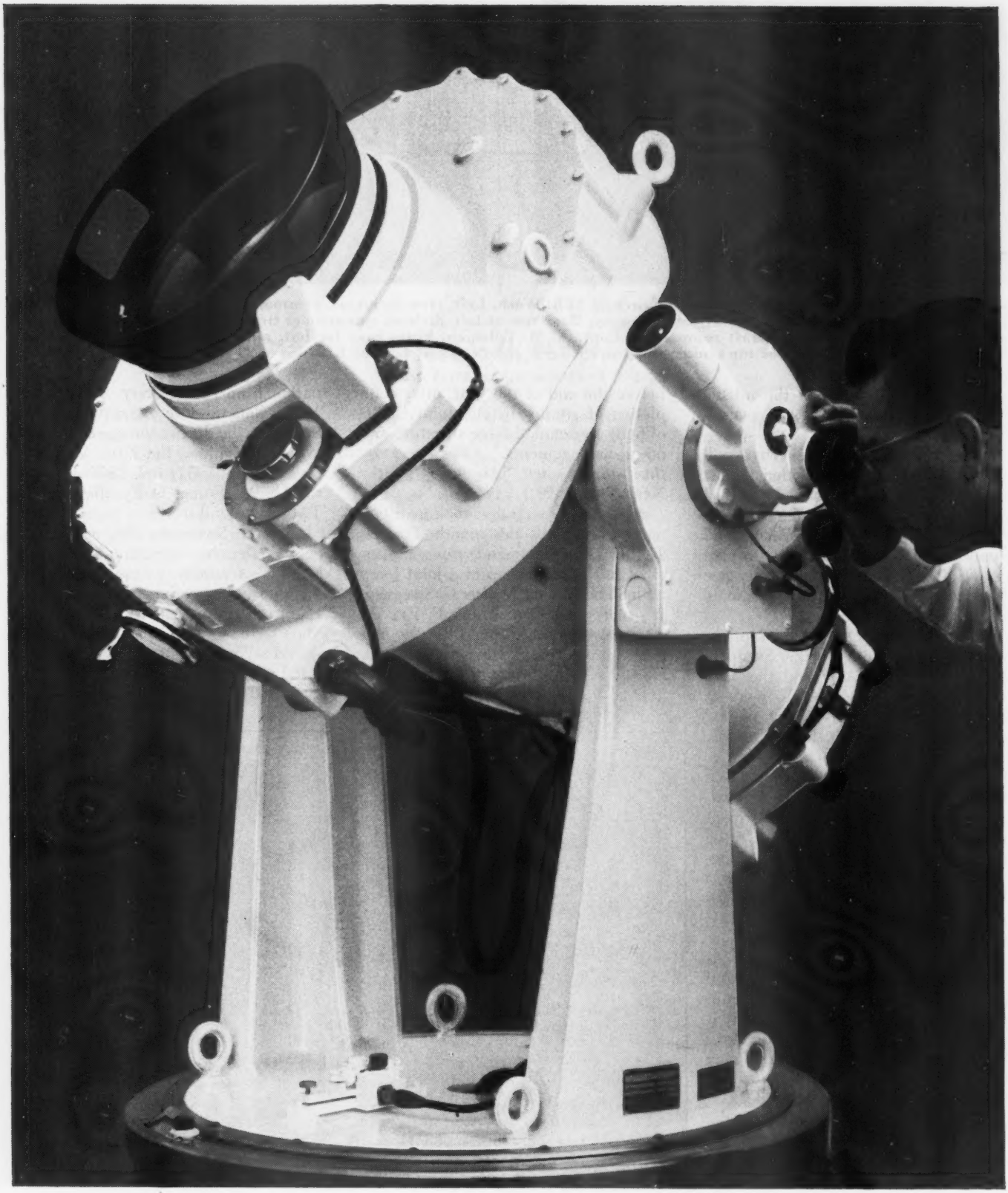


Martin's TITAN Intercontinental Ballistic Missile

TI PROGRAMMERS IN MISSILE SYSTEMS

APPARATUS DIVISION

TEXAS INSTRUMENTS
INCORPORATED
6000 LEMMON AVENUE
P. O. BOX 6015 DALLAS 22, TEXAS



This camera watches the birdie

This is a ballistic camera, designed to photograph a missile in flight, and check its trajectory against a precise background of stars to detect the slightest deviation from course. It is the largest accurate ballistic camera ever built. Its 8-element, 600-mm, f/2 lens has an accuracy of 1 part in 200,000. Though the shutter is 12 inches in diameter, it opens and closes in 2 milliseconds. The entire instrument, including its unique lens and shutter, was designed and manufactured by the Nortronics Division of Northrop.

NORTHROP

In the second major command switch, Lt. Gen. William E. Hall (*see "Ready Room"*) turned over the reins of the Continental Air Command to Maj. Gen. Gordon A. Blake. General Hall, a 1929 West Pointer, has held top Reserve posts for the past eleven years and the prime CONAC post for the past four.

General Blake, West Point 1931, saw Pacific duty during World War II (he was base operations officer at Hickam Field on December 7, 1941), has held high posts in a number of commands since, including a tour as vice commander in chief and chief of staff of the Pacific Air Forces prior to taking charge at CONAC.

★ Jacqueline Cochran did it again—and again. The great aviatrix, who holds more than seventy flight records, on September 15 flew a Northrop T-38 Talon jet trainer to a woman's distance record over a closed course. She went 1,346.3 miles, topping the distance of 1,143.1 miles flown by French aviatrix Elisabeth Boselli in 1955. Miss Cochran flew twice around a 673.15-mile triangular course, passing pylons at Kingman and Stoval, Ariz., and Edwards AFB in California.

Three days after that, September 18, Miss Cochran took her Talon for a record straight-line, point-to-point flight from Palmdale, Calif., to Minneapolis, Minn., a distance of 1,492.3 miles. This topped the previous 1,448.5-mile distance also flown by Miss Boselli in 1955. Miss Cochran, who has turned in a number of record flights in recent months, now lays claim to every major women's speed mark in the world. Miss Cochran is president of the National Aeronautic Association and a lieutenant colonel in the Air Force Reserve.

☆

USAF's response to Russian threats around the globe this month included assignment of eight tactical fighter squadrons to the United States Air Forces in Europe "for overseas operational training." Two were equipped with F-104 and six with F-100 aircraft.

The 434th Tactical Fighter Squadron, a Tactical Air Command rotational squadron, moved from Moron AB, Spain, to Bitburg AB, Germany. Earlier, the 435th TFS arrived at Ramstein AB, Germany. Both fly F-104 Starfighters.

F-100 units involved were the 523d and 429th Squadrons at Chambley AB, France, the 614th Squadron at Ramstein, 355th Squadron at Hahn AB, Germany, 613th Squadron at Spangdahlem AB, Germany, and the 430th Squadron at Moron, Spain.

The 523d, 429th, 614th, and 355th squadrons moved to Europe from the US last month to participate in NATO's Exercise Checkmate. It was suggested then that they might remain overseas for the present.

While with USAFE, the squadrons will be assigned to the Seventeenth Air Force, headquartered at Ramstein AB, Germany. All are TAC outfits.

☆

For Russia, it was a month like any other month. The Reds continued poisoning the atmosphere. By early October the total of Russian nuclear tests in Central Asia or the Arctic regions of the Soviet Union had reached twenty. Yield of the nuclear explosives ranged from kilotons—the equivalent of thousands of tons of TNT—to several megatons—millions of tons of TNT. The nuclear test series began September 1.

Result of tests was heightened radioactivity counts around the globe. The reading at Toronto, Canada, was a thousand times more than normal. Canada forcefully brought the issue before the United Nations this month. Japan reported fallout at the "danger" level and formally protested to the Kremlin. From Europe and from a number of locations in the United States came similar reports of extremely high radioactivity. Russia and Communist China, apparently, were also recording high-radioactivity counts.

Direct US reaction for the resumption of Russian nuclear tests after a three-year international moratorium on testing was conduct of three underground tests this month at Nevada's testing grounds—on September 15 and 16 and October 10. Contrasted to the Red tests, the US underground blasts dropped no fallout on the world's populations. Aim of US testing was believed to be perfection of small battlefield atomic weapons.

In addition to its dangerous nuclear blasting, the Russians between mid-September and mid-October fired four superrockets into the Pacific in a series of overwater rocket shots similar to those of last year. The shots each went some 7,500 miles.

☆

In further hardware news:

(Continued on page 25)

Hughes' FALCON Air-to-Air Missiles in front of Convair F-102A

TI INFRARED OPTICS
IN MISSILE SYSTEMS

APPARATUS DIVISION

TEXAS INSTRUMENTS
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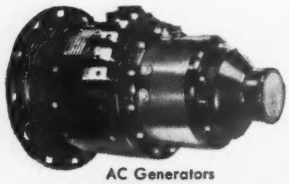
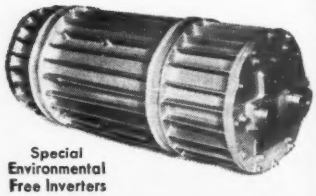
HIGH-TEMPERATURE BRUSHLESS AC GENERATING SYSTEMS



AC Generators

Solid-State AC Voltage Regulators and System Components

INVERTERS

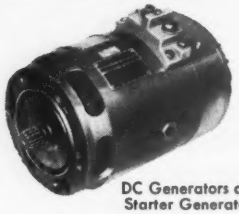


Special Environmental Free Inverters

High Altitude and Missile Inverters

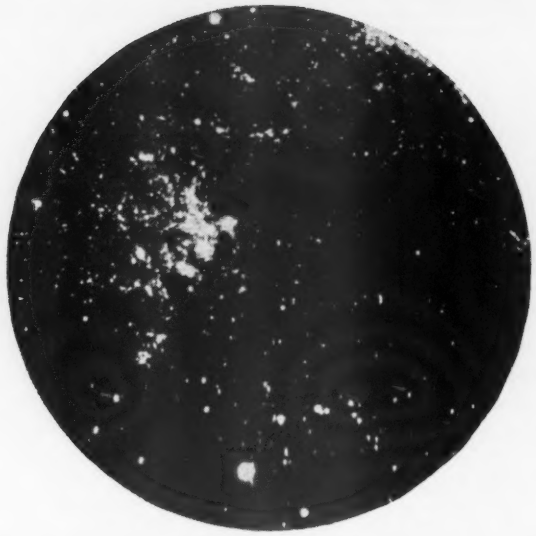
Static Inverters

HIGH-TEMPERATURE DC GENERATING SYSTEMS



DC Generators and Starter Generators

DC Voltage Regulators and Control Panels



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THE Bendix CORPORATION

The Air Force launched **Discoverer XXX** from Vandenberg AFB, Calif., on September 12. Its gold-plated capsule was recovered on September 15 by a USAF C-130 in the vicinity of the Hawaiian Islands. It was the fifth aerial catch of the series. Three other capsules have been recovered from the water. It was also the first recovery for a turboprop C-130; previous catches were made from C-119s. Pilot of the catch plane was Capt. Warren C. Shensted, who also spotted the capsule of Discoverer XXV and guided skindivers to it in June. Another Discoverer, XXXI, was put up this month, but the capsule recovery effort failed.

A camera-loaded **Samos III** satellite blew up on its pad at the Navy's Point Arguello, Calif., launch complex on September 9 in a tremendous ball of flame. A Nike-Zeus developmental antimissile missile met a similar fate over nearby Point Mugu, Calif.

Meanwhile, also on September 9, the first of a series of drop tests of the Air Force **Skybolt** air-launched ballistic missile was completed from a B-52 at the Air Proving Ground Center, Eglin AFB, Fla. The B-52H will carry four Skybolts when the missile comes into service.

The National Aeronautics and Space Administration put a **Project Mercury** space capsule into orbit from the Cape and recovered it from the Atlantic after one trip around the earth on September 13. The two-ton capsule carried an "artificial astronaut"—a gray box of instruments called a crewman-simulator that consumed oxygen, expelled carbon dioxide, filled the space capsule with heat and moisture as a human astronaut would. The capsule successfully "talked" to earth by prerecorded messages. The shot, a step in the direction of manned orbital flight for the US such as the Russians have already achieved with two orbital shots, was a partial success. Project Mercury operations director Walter C. Williams told newsmen that "we feel very good" about the shot and "as far as we know" a human astronaut would have survived the orbital ride. But he also revealed that the oxygen system in the craft apparently sprang a leak and there was communications failure for a period. Likelihood of a US manned orbital shot before next year, it was judged, was small. This was the second attempt at a "simulated man" orbital shot. The first, last April, failed when the Atlas booster blew up. The Atlas worked perfectly this time.

The Air Defense Command's **F-106 Delta Dart** interceptor was temporarily grounded at the beginning of October as a precautionary measure after two accidents involving the Convair-produced plane. The order applied to twelve squadrons equipped with F-106s throughout the United States, some twenty planes to a squadron.

Men in the aerospace news. Left to right: Army Lt. Gen. P. D. Adams, head of newly created joint TAC-STRAC force. New TAC commander Gen. Walter Sweeney. Sen. A. S. (Mike) Monroney, recipient of this year's Wright Trophy for contributions to aviation. D. Brainerd Holmes, chosen NASA's "Mr. Moon."

☆

ELSEWHERE IN THE AEROSPACE WORLD:

SAC held its 1961 Combat Competition at Fairchild AFB, Wash. The Fairchild Trophy for navigation-bombing proficiency went to two B-52 bomber crews of the 4137th Strategic Wing, Robins AFB, Ga. The Saunders Trophy, awarded annually to the top tanker unit, went to two KC-135s of the 915th Air Refueling Squadron, Ramey AFB, Puerto Rico.

These were the victors in various categories of the annual competition: Over-all Bomber Crew—4137th Strategic Wing. Bomber Crew Bombing—4137th. Wing Bombing—4137th. Bomber Wing Navigation—42d Bomber Wing. Bomber Crew Navigation—2d Bomber Wing. Best Over-all Munition Loading Team—32d Munitions Maintenance Squadron, Chennault

(Continued on page 27)

Environmental Testing of TARmac ASR-4 Airport Surveillance Radar System, developed and produced for the Federal Aviation Agency.

TI IN HEAVY RADAR SYSTEMS

APPARATUS DIVISION

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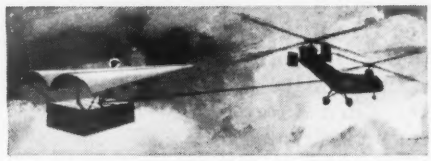
RYAN RESEARCH VEHICLE SPEARHEADS FLEX WING APPLICATIONS

With the world's first manned Flex Wing vehicle, Ryan engineers are uncovering valuable new flight data which will adapt this concept to a broad variety of important military and space applications.

Recovery of huge boosters, nose cones and capsules... re-entry of space vehicles at reduced velocities ... helicopter tow of logistics payloads... controlled delivery of air-dropped cargoes to "pin-point" landings... small reconnaissance drones to meet combat needs. These are a few of the multiple applications for which the Flex Wing can be used.

Based on a National Aeronautics and Space Administration concept, the Flex Wing provides greater lift per weight than fixed wings, is superior in inherent stability and can be precision-controlled in both powered and unpowered versions. It can be packaged into an extremely small volume and then deployed faster than any other deceleration or lifting devices.



Ryan Flex Wing enables helicopters to tow several times the cargo or fuel they can carry

Ryan has received several contracts from NASA and the military services to explore and develop the more promising Flex Wing applications. Pioneering an entirely new concept, such as Flex Wing, is typical of Ryan's Space Age capabilities.

Ryan Aerospace – Ryan Aeronautical Company, San Diego, California.

RYAN AEROSPACE

AFB, La. Best B-47 Loading Team—32d MMS. Best B-52 Loading Team—63d MMS, Beale AFB, Calif. Fairchild Munitions Loading—9th Bomber Wing, Mountain Home AFB, Idaho. Over-all Tanker Crew—911th Air Refueling Squadron, Seymour Johnson AFB, N. C. Best Over-all KC-97 Unit—340th ARS, Whiteman AFB, Mo. Best Over-all KC-135 Unit—915th ARS, Ramey AFB, Puerto Rico.

Army Lt. Gen. A. T. McNamara was named to head the new Joint Defense Supply Agency.

NASA chose D. Brainerd Holmes, a Radio Corporation of America executive, to be the nation's "Mr. Moon," head of the US moon project. Houston, Tex., was chosen as the site of a $60 million laboratory to act as command center for manned flights to the moon.

The US created a permanent government Arms Control and Disarmament Agency. William C. Foster, former Assistant Secretary of Defense, was appointed its first head.

Russia claimed that a twin-jet antisubmarine seaplane, which was shown at the Moscow air show in June, had broken twelve altitude and speed records for a variety of cargo categories and distance categories.

Lyle S. Garlock, the Assistant Secretary of the Air Force who was honored as "Airpower's Man of the Year" at the AFA Convention in Philadelphia, resigned after twenty-seven years of government service. He was appointed director of federal activities for Eastern Air Lines in Washington.

USAF has established a Council of Scientists under Chief Scientist Dr. Leonard S. Sheingold to provide advice, technical information, and coordination at the top levels of the service in scientific and technical fields.

Sen. A. S. (Mike) Monroney of Oklahoma will receive the 1961 Wright Memorial Trophy at the annual Aero Club of Washington's Wright Day Dinner on December 17. Author of the Federal Aviation Act and chairman of the Senate Aviation Subcommittee, Senator Monroney will be honored for "dedication to the advancement of aviation safety and equitable regulations in aviation" during more than two decades.

☆

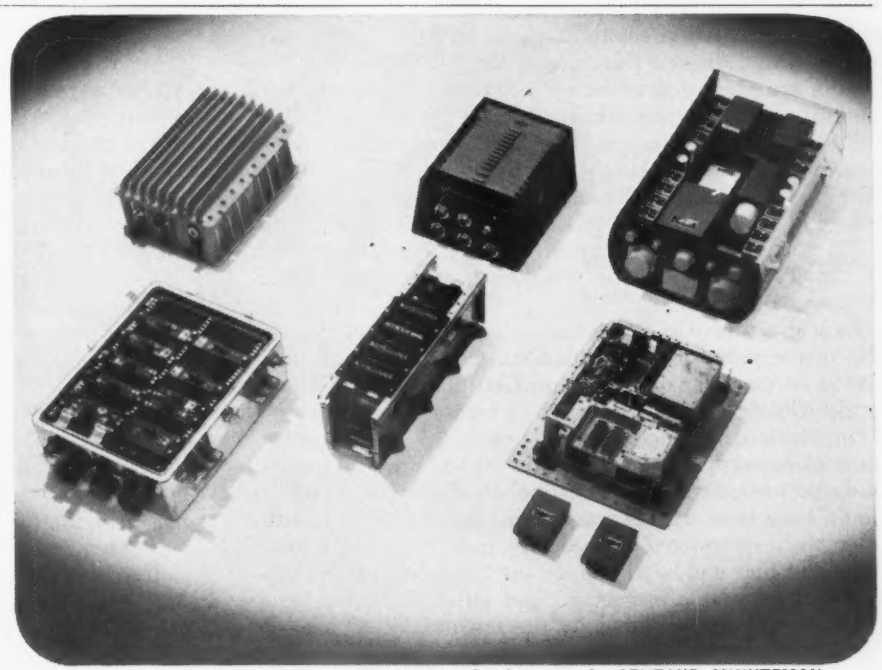
STAFF CHANGES . . . . Brig. Gen. Milton H. Ashkins, from Chief, Air Section, MAAG, Germany, to Deputy Director, Military Assistance Division, US European Command. . . . **Brig. Gen. Theodore C. Bedwell, Jr.,** from Commander, USAF Aerospace Medical Center, ATC, to Commander, Bioastronautics Division, AFSC, Brooks AFB, Tex. . . . **Lt. Gen. William H. Blanchard,** from Assistant to TIG, to TIG, Hq. USAF. . . . **Lt. Gen. Joseph F. Carroll,** from TIG, Hq. USAF, to Director, Defense Intelligence Agency, Washington, D. C. . . . **Maj. Gen. Keith K. Compton,** from Deputy Director of Operations, to Director of Operations, Hq. SAC, Offutt AFB, Neb. . . . **Lt. Gen. James Ferguson,** from Vice Commander, AFSC, Andrews AFB, to DCS/Research and Technology, Hq. USAF.

Brig. Gen. Jack A. Gibbs, from Assistant to DCS/P, Hq. USAF, to Deputy Director of Operational Requirements, DCS/O, Hq. USAF . . . **Brig. Gen. Alvan C. Gillem II,** from Commander, 820th Air Division, SAC, Plattsburgh AFB, N. Y., to Commander, 57th Air Division, SAC, Westover AFB, Mass. . . . **Brig. Gen. Jamie Gough,** from Deputy Director for Operational Resources, to Deputy Director for Operational Forces, DCS/O, Hq. USAF. . . . **Brig. Gen. Linscott A. Hall,** from Commander, Air Force Intelligence Center, Arlington, Va., to Deputy Assistant Chief of Staff, Intelligence, Hq. USAF. . . . **Brig. Gen. William B. Kieffer,** from Commander, 45th Air Division, SAC, Loring AFB, Me., to Director of Personnel, Hq. SAC, Offutt AFB, Neb.

Brig. Gen. William G. Lee, Jr., from Deputy Assistant Chief of Staff, Intelligence, Hq. USAF, to Deputy Director for Intelligence, J-2, The Joint Staff, DoD, Washington, D. C. . . . **Brig. Gen. John C. Meyer,** from Commander, 57th Air Division, SAC, Westover AFB, Mass., to Commander, 45th Air Division, SAC, Loring AFB, Me. . . . **Brig. Gen. Robert C. Richardson III,** from Deputy Director, Military Assistance Division, US European Command, to Deputy Standing Group Representative to the North Atlantic Council. . . . **Maj. Gen. Austin J. Russell,** from Director of Personnel, to Deputy Director of Operations, Hq. SAC, Offutt AFB, Neb. . . . **Brig. Gen. Benjamin A. Strickland, Jr.,** from Deputy Assistant for Bioastronautics, to Assistant for Bioastronautics, Hq. AFSC, Andrews AFB, Washington D. C. . . . **Brig. Gen. Milton Summerfelt,** from Deputy Commander, Sacramento AMA, AFLC, McClellan AFB, Calif., to Member, SAF Personnel Council, OSAF, Washington, D. C. . . . **Brig. Gen. Jack E. Thomas,** from Deputy Director for Intelligence, J-2, The Joint Staff, Washington, D. C., to Commander, Air Force Intelligence Center, Arlington, Va.

PROMOTIONS . . . . To the rank of lieutenant general: William H. **Blanchard,** James **Ferguson** . . . To the rank of brigardier general: William B. **Campbell,** Richard O. **Hunziker,** Godfrey T. **McHugh,** Larry A. **Smith.**

RETIRED . . . . Brig. Gen. Norman L. **Callish.**—END



TI telemetry developments for CENTAUR, MINUTEMAN, TITAN, PERSHING, BOMARC and Project MERCURY.

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AIRPOWER in the news

The New Command

WASHINGTON, D. C.

Formation of the new United States Strike Command is under way at MacDill Air Force Base in Florida. It will be composed of units of the Strategic Army Corps (STRAC) and the Tactical Air Command (TAC). A month after the initial announcement there still was no definitive information on the makeup of the new command and the mission was not clear. Robert S. McNamara, Secretary of Defense, announced that Strike "will provide combat-ready land and tactical air forces which can be rapidly moved when required to augment US forces already deployed or to carry out such other contingency missions as may be assigned by the Secretary of Defense or the Joint Chiefs of Staff."

"The new unified command," he said, "will develop doctrine for the integrated employment of the land and tactical air forces assigned and will be responsible for the training necessary to weld these forces into an efficient land-air team. The command will conduct regular training exercises to ensure a high level of combat effectiveness and a rapid reaction capability."

The Army, the Air Force, and the Joint Chiefs at this writing are preparing to set up a firm mission, a step that must precede an exact selection of the STRAC and TAC units that will be merged. The Strike commander, Army Gen. Paul D. Adams, fought as a Ranger in Italy in World War II, was a divisional commander in Korea, and was in charge of land operations in Lebanon in 1958. His deputy is Lt. Gen. Bruce Holloway of the Air Force, a veteran of the Pacific and more recently head of the USAF Weapons Board.

Basically, the Air Force can claim credit for sponsorship of the new concept. Both Gen. O. P. Weyland, now-retired commander of TAC, and Gen. Thomas D. White, former Chief of Staff, are known to have favored this type of unification. As the program developed out of a few years of discussion and one of Mr. McNamara's numbered study projects, Strike does not include Navy forces, which would have been included under original USAF proposals. They were considered a necessary part of a real unified command that will need surface sea transport, carrier support, antisubmarine protection, and all of the amphibious landing capability dictated by the mission.

Secretary McNamara, queried about failure to include the Navy, replied only that "Marine divisions and their tactical operations are closely associated with the Navy, and in a very real sense there is already a unified command covering the Marine divisions." This would seem to indicate that the Administration is content to have two unified commands with similar combat capability. This was explained frankly: "The Marines," the Secretary said, "already have . . . what we are establishing for the Army and the Air [Force]."

The new command actually marks another step toward unification of the armed forces within the framework of the existing law. It will put another combat-ready force at the immediate disposal of the Joint Chiefs and the Secretary of Defense.

As the Strike Command was getting up steam, Gen. Curtis E. LeMay, USAF Chief of Staff, disclosed that in the future both TAC and the Strategic Air Command will be served by a single jet-tanker force now being set up. The purpose, of course, is to get maximum utility and economy out of USAF equipment, while meeting the requirements of both commands.

How to Save 12 Lives

There were 100,000 spectators at that air show in Wilmington, N.C., in late September when a C-123 assault transport crashed with fifteen men aboard. The drama was provided by an Air Force H-43B helicopter.

When the crash took place the helicopter was on static display, set off on the ramp behind ropes. The crew was sitting outside watching the air show. Within two minutes they were aboard, had pushed the helicopter out of the display area, and were flying down the field to the crash scene. The pilot, Capt. Jack Armstrong, hovered over the nose of the burning aircraft so that his rotor downwash blasted through the smashed cockpit windows. This made it possible for firemen on the ground to enter the airplane as the blast of air kept the fuselage clear of smoke, fumes, heat, and flame.

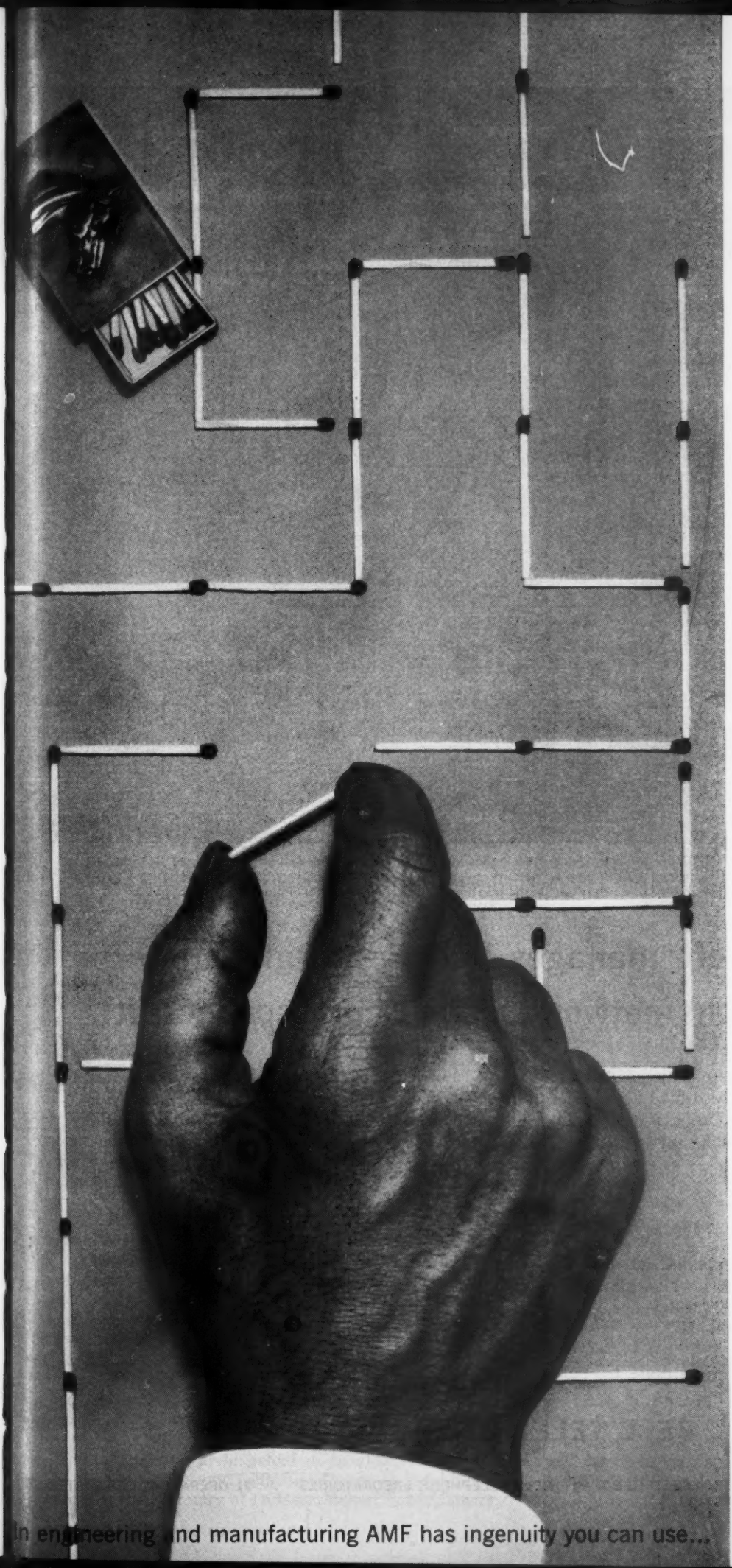
Eyewitnesses report that rescuers worked for ten minutes freeing victims trapped in the cockpit and for fifteen minutes in the midsection of the aircraft to release an Army sky diver who was pinned by wreckage. At one point Captain Armstrong landed the helicopter to discharge other crewmen and the flight surgeon. In that moment smoke billowed through the plane, overcoming one fireman. The H-43 also evacuated three critically injured survivors to the hospital.

Because the H-43 was on the scene twelve of the fifteen men aboard the aircraft are alive today. They include members of the Army sky-diving team, newspaper reporters, and television cameramen. The three who died were members of the C-123 crew. None of those rescued suffered from burns.

The helicopter was from Seymour Johnson AFB in North Carolina. In addition to Captain Armstrong those in the crew were Lt. Charles Morrill, copilot; SSgt. Donald H. Holloman, and A1C Gene Mayo, both crash-crew specialists; and Capt. Charles Pummill, the flight surgeon. All are in the Air Rescue Service, part of MATS.

In view of experiences like this it is difficult to understand the resistance of some officials, including those at the Federal Aviation Agency, to further utilization and development of the helicopter as a piece of crash rescue equipment at major commercial airports. Cost is cited as a major handicap, but who can put a price on the rescue job at Wilmington?

(*Continued on page 31*)



He designed a new interchange for radio traffic

This AMF engineer, part of an AMF-U.S. Army team, solved the problem of traffic delays and personal danger in manual re-connection of jumpers when interchanging R.F. transmitters and antennas.

His solution is a push-button-operated, coaxial crossbar switching system, using vacuum switches for circuit selection. A typical system consists of 4 transmitter inputs, 7 antenna outputs plus a dummy load, in a 4 x 8 matrix that can be mounted in a 19" rack. It can be controlled locally or remotely over any type of communication network having a bandwidth of at least 200 cycles.

AMF's coaxial crossbar switching system provides 100% flexibility in circuit path selection and accommodates power levels as high as 500,000 watts and frequencies up to 30 megacycles. It allows 100% utilization of all transmitting equipment. Stubs are automatically eliminated.

To insure fail-safe operation, power is required for the vacuum switches *only* during change of condition. Selection rate: 1 per second. Operating transmitters are safety-interlocked to insure a load. There are no hazards from open wires or inadvertent application of power to dead-lined antennas.

Single Command Concept

AMF's imagination and skills are organized in a *single operational unit* offering a wide range of engineering and production capabilities. Its purpose: to accept assignments at any stage from concept through development, production, and service training...and to complete them faster...in

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- *Space Environment Equipment*
- *Nuclear Research & Development*

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In Mercury Control Center room at Cape Canaveral, designed under supervision of Bell Telephone Laboratories, NASA flight controllers make all vital decisions concerning a Mercury mission. Large map displays equipment status at tracking and communications sites, preferred recovery areas, the position of the capsule and its "immediate impact point."

Bell System manages building of global communications network for Mercury spacecraft

On September 13, National Aeronautics and Space Administration first achieved the orbital flight of an unmanned Mercury spacecraft, using a new world-wide communications and tracking network.

Soon, will come manned orbital flight.

The Bell System has played a large role in the development of this scientific project.

Western Electric headed an industrial team on which Bell Telephone Laboratories also played an important part in building the world-wide network of tracking and monitoring stations.

This 60,000-mile communications route, the bulk of which is teletypewriter and telephone circuits, ties together 17 tracking and instrumentation sites with the Goddard Space Flight Center in Greenbelt, Md., and the Cape Canaveral Mercury Control Center.

As a Mercury capsule orbits over the area covered by each site, the far-reaching communications network immediately begins feeding information received from the capsule with clockwork precision. So fast and efficient is this communications system, it takes only seconds for data to start flowing from any site through Goddard to Canaveral!

The Bell System is proud to have contributed its creativity and resources to this vital project and to the further advancement of global communications.

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A Job for Congress

Congress has gone home. While it is there, away from the pressures of workaday affairs in the Capitol, it has been suggested that it should put some contemplation into the problems it creates as well as the ones it tries to solve. A major one has been pointed up by Secretary of Defense McNamara with the application of a little arithmetic to his working schedules. This compilation shows that in the recent session he spent eighty-eight hours testifying before Senate and House committees. Between late January and early September he spent some part of twenty-four working days on Capitol Hill. He is known to spend between three and four hours on preparation for each hour he spends on the witness stand.

It is not possible to round up figures like this for everyone else in the Pentagon and related offices all over the world who must give part of their working time to congressional inquisition, but the figures would be staggering. In terms of man-hours, which means money, they would overshadow most of the laments of the General Accounting Office about signs of waste that can be uncovered in a study of the procurement of pencil sharpeners.

One committee counsel of our acquaintance, a man of many years' experience, has said that Congress itself is "the worst offender in government when it comes to duplication of effort and the sheer waste of manpower and money." The reference here was to the myriad of investigations by House and Senate committees. It is a rare subject indeed that is probed by only one set of legislators, and it is a rare committee chairman who dares to warn another to stay out of his corral.

Back of much of this duplication is the realization that there is rewarding publicity in many of the inquiries, which is to say in the ones that aim to hunt for some sign of skulduggery. It would be pleasant news if, when Congress returns, the leadership could agree on some pattern of legislative discipline that will ease the burden, not only on Mr. McNamara but on all of the other civil and military servants who have important work to do. The answer may be in more joint committees or in a closer delineation of jurisdictions. It may lie in more competent professional staffs with fewer political sinecures behind desks in the sprawling office buildings. It is time for Congress to investigate Congress.

Credibility Reincarnated

It was with a pose of incredulity that the Administration responded to assertions that the nuclear deterrent had lost its credibility. The provocative platform proved to be the US Senate, where Margaret Chase Smith, the unobtrusive Republican lady from Maine, charged that our capacity to deal with Khrushchev had been crippled by our publicized reluctance to use nuclear weapons. She said that the Kennedy Administration's emphasis on conventional weapons played into the Kremlin's hands. "What has happened that permits Khrushchev to act as he does?" she asked. Then she gave the answer: that he is convinced we lack the will to use nuclear power. Her words were spoken while the Air Force Association was in Convention at Philadelphia to adopt a Statement of Policy which declared (*see pages 8 and 9*) that the credibility of the deterrent "has been undermined by Soviet confidence in its own rising strength and by Soviet belief that the United States is unwilling to engage in nuclear war in behalf of freedom." About the same time, this magazine contributed some irrefutable evidence that the Secretary of Defense, Robert S. McNamara, had announced his reluctance even to defend North America with nuclear devices. The illustration had the advantage of being well divorced from the crisis in Berlin and the wrangle over the possibility of a nuclear war in Europe. It was concerned entirely with our own protection from enemy attack and how that job should be done.

From the reaction to all this it is impossible to escape the conclusion that an international service was performed for the cause of Western security. The Administration hastened to rebuild credibility as fast as it could. Senator Stuart Symington, the Missouri Democrat who is a former Secretary of the Air Force, told the Senate we are ready to use nuclear weapons. He added that if Khrushchev does not believe this, as Mrs. Smith suspected, "in his disbelief lies the greatest danger to world peace." The President's brother, Robert F. Kennedy, agreed, saying that one of the big perils in the Berlin crisis would be a miscalculation on this question by the Kremlin. "There's no question," said the Attorney General, "that [the President] is prepared to use nuclear weapons if it comes to that." On top of this Secretary McNamara, using a platform in the New York *Herald Tribune*, called Mrs. Smith's argument "nonsense," and said we will "respond with whatever weapons and in whatever quantities [the US] considers necessary to protect its freedom. . . ." This presumably is a reversal of the stand he took before the Senate Defense Appropriations Subcommittee, where he said, "We think the possible effect of initiating the use of nuclear weapons with a Nike-Hercules attack on a relatively small force attacking a city should be avoided if possible." Most forceful of all was President Kennedy's masterful speech before the United Nations, in which he said he wants every nation to know "the United States has both the will and the weapons to join free men in standing up to their responsibilities."

These assurances are heartening, and there is little doubt they are being heard and heeded in Moscow. The attitude bordering on amazement, shown by the Administration when the credibility issue was raised, is difficult to understand. It has been suggested that the intellectuals surrounding the President are insulated from the kind of facts that seem to jar the rest of us so regularly. Contrary to Mr. McNamara, the case made by Mrs. Smith and other critics is not "nonsense." Hanson Baldwin, military editor of the New York *Times*, wrote this after a September visit to both generals and diplomats stationed in Europe: "Talks with many of these leaders . . . indicate that the majority . . . do not think that the United States nuclear deterrent is credible in Mr. Khrushchev's mind. They fear that he believes the United States is bluffing. . . ."

There is no record that these leaders, military and diplomatic, have changed their minds since the sudden effort to restore credibility. Let us hope it was not too late.

Disciplinarian in Action

Sometime this winter there will be a "study and appraisal" of charges that the Defense Department is being overzealous in its censorship of speeches by military officers. The hearings, authorized in a resolution that carefully avoids calling them an "investigation," will be held by the Preparedness Investigating Subcommittee of the Senate Armed Services Committee. The chairman of this group is an astute gentleman from Mississippi, Senator John Stennis, who is a former judge. He has promised that his "study" will be a "serious, semijudicial" affair, that personalities will be eschewed, and that he will put emphasis on the constitutional line between civilian and military authority.

(Continued on following page)

Arthur Sylvester, Assistant Secretary of Defense for Public Affairs.

It is unfortunate that the most widely publicized background for the "study" has been the badly handled case of the Army's Maj. Gen. Edwin A. Walker, a self-admitted right-wing extremist, accused of retailing John Birch Society doctrine to troops in Germany. On top of this there has been a spate of ZI activity in the form of Army-sponsored or -supported meetings with political overtones that are offensive to some critics. If the Stennis Subcommittee spotlight falls only on the activity of a few scattered miscreants and part of the lunatic fringe there will be much wasted effort.

There are indications that the broad picture is the one deserving of examination. Take, for example, the case of Arthur Sylvester, Assistant Secretary of Defense for Public Affairs. As an agent of Defense Secretary Robert S. McNamara, Mr. Sylvester is the man with administrative responsibility for the actions that have been taken. This ranges from an early example, such as the changes made in a speech to be given by the Chief of Naval Operations, to the botched-up handling of the Walker case.

There are hints, here and there, of Mr. Sylvester's approach to his job, which essentially is one of distrust and suspicion if not downright antagonism to the military services, the defense contractors, and the press. Hanson Baldwin of the New York *Times* has reported from Germany that General Walker's colleagues have been shocked by the summary treatment he received. They hold little, if any, sympathy for his zealot opinions and his conduct, but they blame Mr. Sylvester for the fact that the Pentagon took precipitate action and ordered his relief. He was moved from his command while an Army investigation was under way. Then there was a press release, put out by Mr. Sylvester in Washington, "couched in such extreme terms" that senior officers in Germany refused to publish it. There was somewhat similar resentment over the handling of the Jack Paar TV incident in Berlin. All of these items, going back at least as far as the censorship of a speech by Adm. Arleigh Burke, follow the same pattern in their climax. This is distinguished by a note of braggadocio, a notice that another military delinquent has been put in his place, by golly, by the former Washington correspondent of the Newark *News* who now sits in the front office.

Mr. Sylvester is a bit bashful about putting himself on the record with what he really believes about men in uniform, but he has been more frank in speaking of the press. Not long ago he was interviewed for a local TV audience in Newark, N. J., by that state's Republican Senator Clifford Case. Mr. Sylvester made it clear that he believes much of his difficulty "goes to the fact that the new Secretary [Mr. McNamara] is trying to exploit to the full his powers of civilian control over the military."

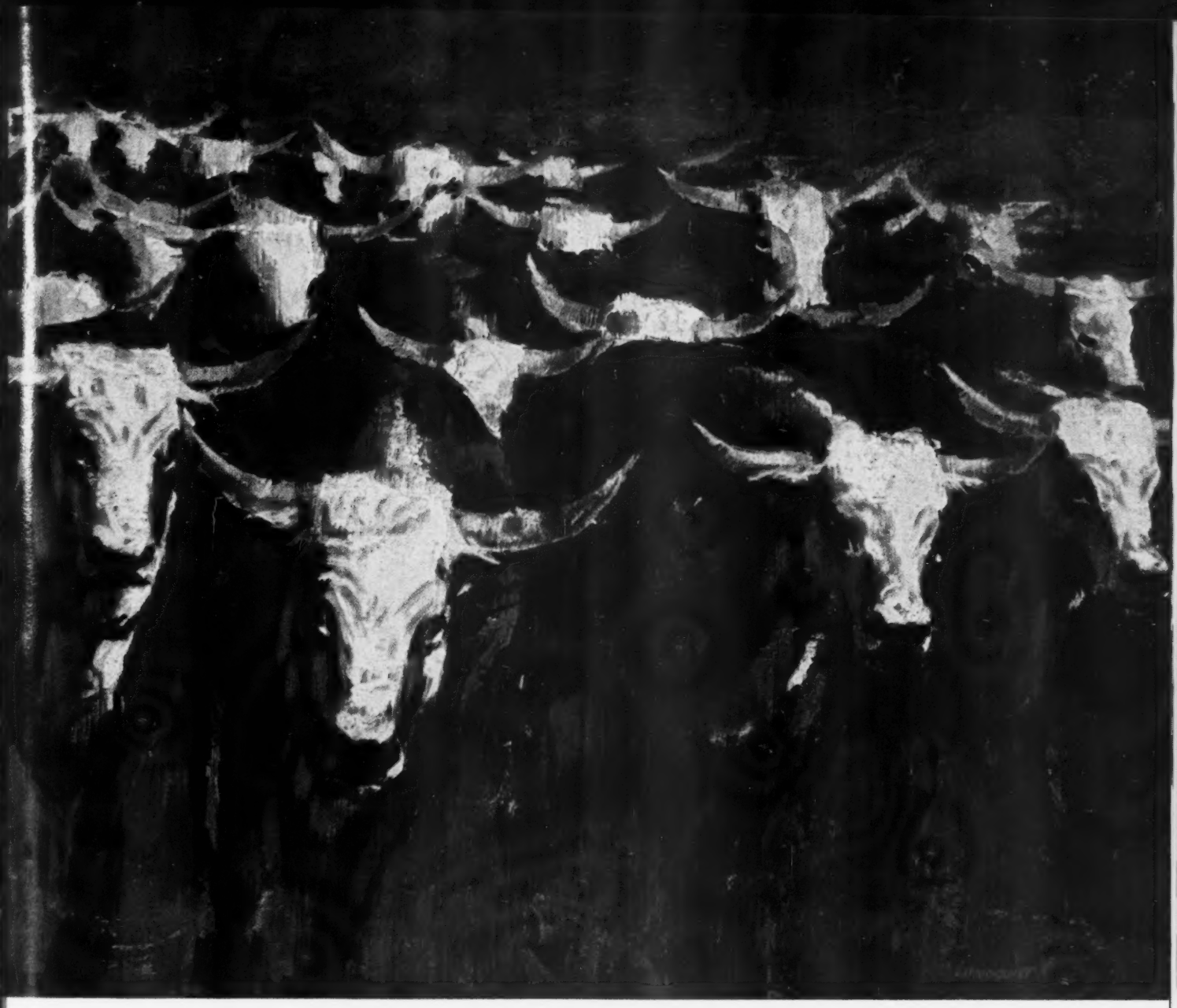
Senator Case asked whether Mr. Sylvester, himself a former reporter, thought the press is doing a good job. The reply, in essence, was that military reporting—that done by the regular Pentagon press corps—is not analytical and critical of the military services. The Assistant Secretary told the Senator that, as a politician, he certainly is familiar with "incisive and hard-hitting" reporting and indicated he does not find newspaper work of that quality in headquarters of the Defense Department. There is no evidence that blood pressures rose in the Pentagon newsroom, but Mr. Sylvester most certainly says in the transcript of the TV interview that there is a "great deal [of] commitment by newsmen to the military establishments as such . . . very often newsmen become committed and advocates." This kind of gratuitous insult, flung at a group that includes a few dozen men employed by daily newspapers, wire services, and news magazines, does not involve any issues surrounding freedom of information, censorship, or even the availability of Defense Department officials as sources of information. It is a blunt charge reflecting on the professional standards of the Pentagon press corps, if not its ethics. It is a subject that Senator Stennis could pursue, even if it is ignored by the American Society of Newspaper Editors.

Possibly the most revealing thing Mr. Sylvester said before the Newark TV camera was that he thinks "there are times when the newsman's interest and the official's interest must inevitably conflict. And at that time the official must stand up and not take a beating from the newsman." He is, of course, right about that. What Senator Case, as the inquisitor, failed to bring out is that analytical and critical reporting of Pentagon activity will require not only the tolerance but the encouragement of this inevitable conflict. But Mr. Sylvester will have no part of it. He used to be a newspaperman himself, he said, but "I have a different function now."

The Assistant Secretary for Public Affairs further says in the TV interview that "we are trying to reduce the public relations aspect of new weapons." This part of what he sees as his mission is reflected in his relations with defense industry, the other half of the national security effort. The release of information about new contracts, for example, now is viewed as a matter of primary concern to congressmen but rarely to the contractors.

One of Mr. Sylvester's favorite approaches to his consecrated task of smashing what he sees as a misalliance of the military, defense industry, and the press is the bypassing or sidetracking of the existing machinery for doing what should be his job. Military information services, industry information offices, and the regular Pentagon press corps are somewhat consistently shunted aside in one of Washington's most efficient utilizations of "controlled news."

The files are accumulating thick folders of information, usually in the form of interviews, put together by writers with little or no Pentagon experience. On one recent occasion a reporter was reluctantly granted an interview with Secretary McNamara on a "no-attribution" basis. A day or two later a prominent Washington correspondent, clearly chosen as an outlet by the Assistant Secretary, was called in for an on-the-record interview on the same subject. The technique is an old one. It is used to win favorable handling of the information, to outflank any tendency of a reporter on a regular beat to use his background to turn out the kind of "incisive and hard-hitting" critical analysis that Mr. Sylvester says he admires.—END



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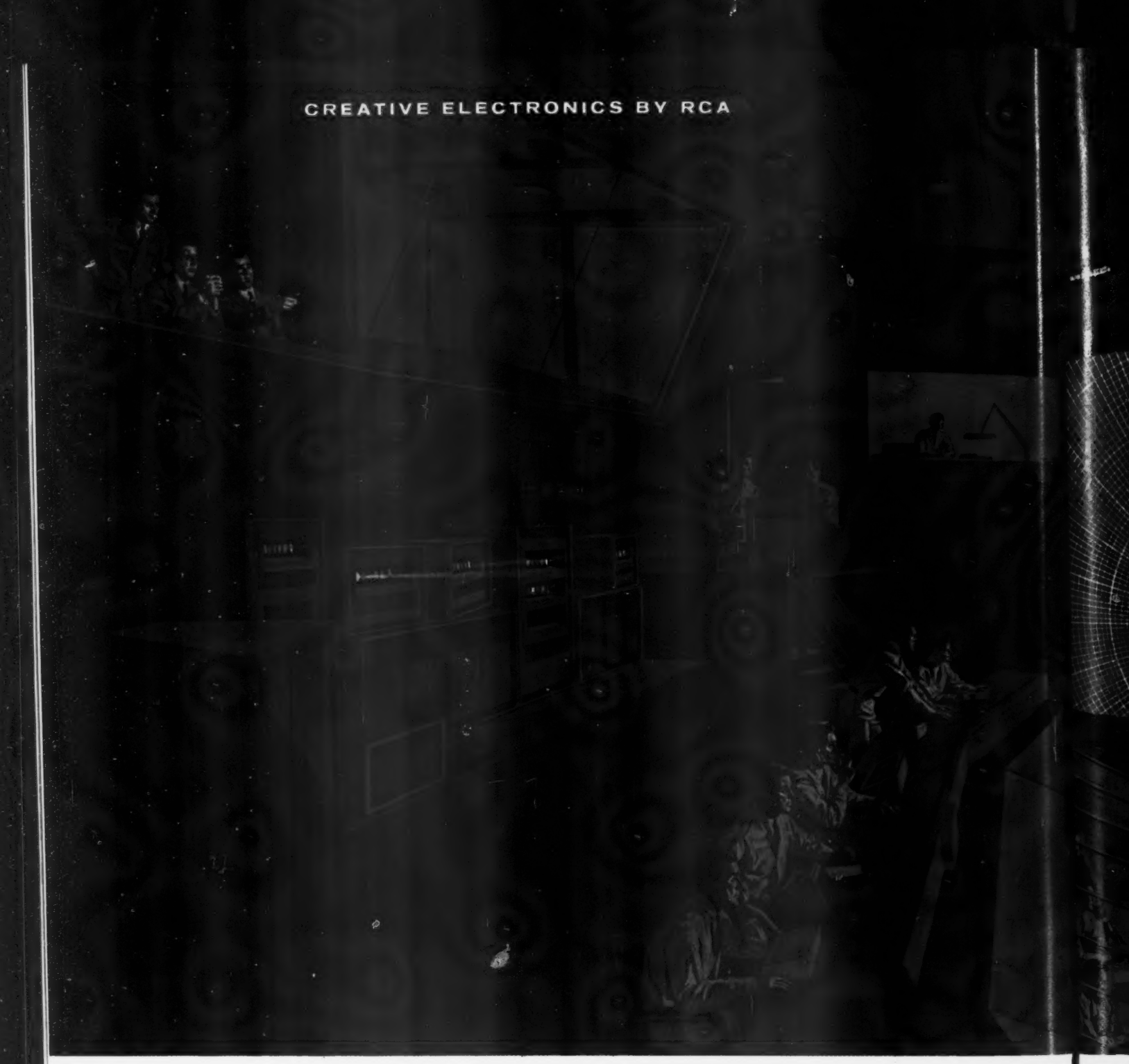

NORAD ON THE ALERT

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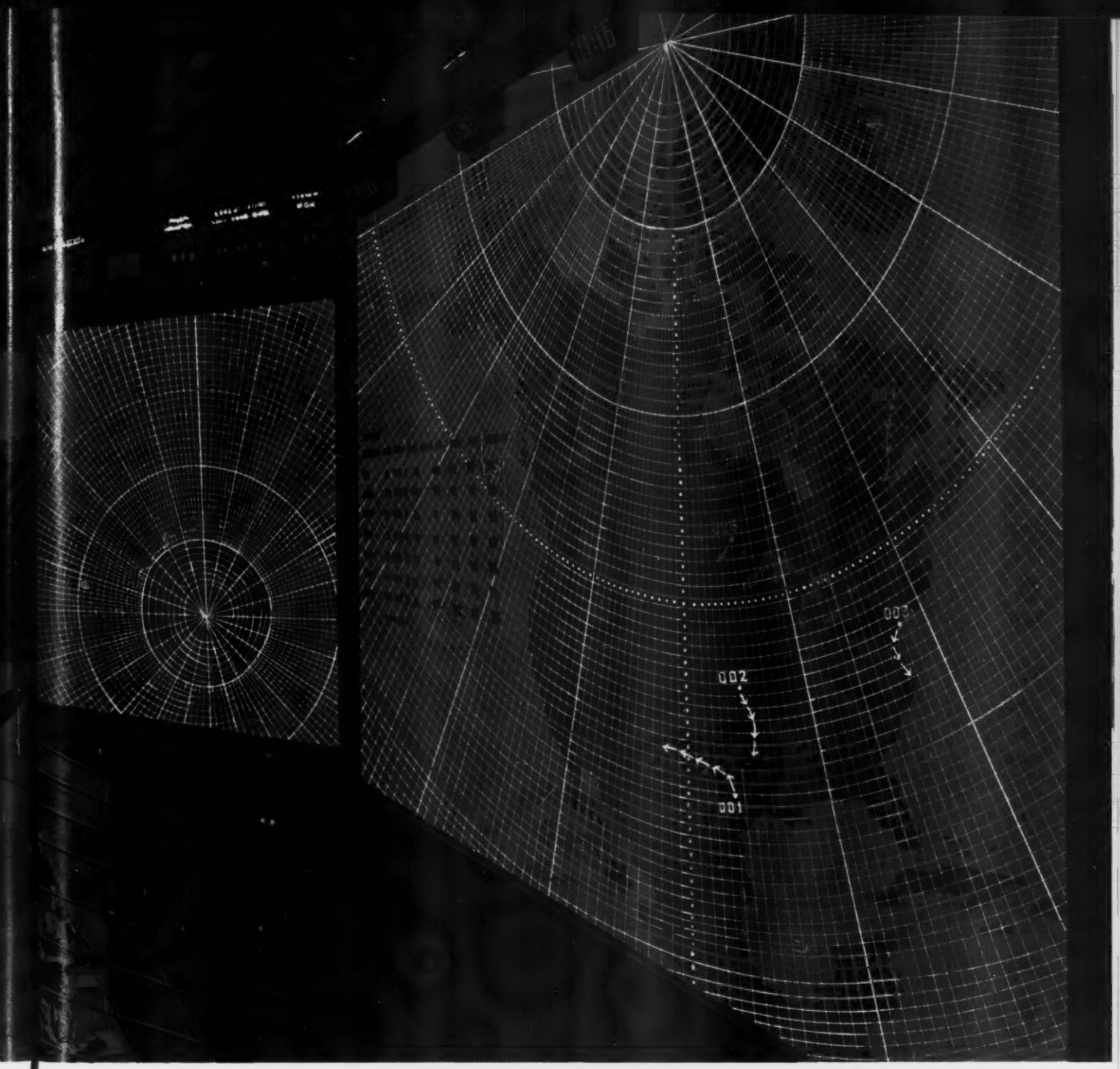

At NORAD Headquarters, RCA computing equipment, the Display Information Processor (control console shown here) receives sightings data from BMEWS and processes it for automatic readout.

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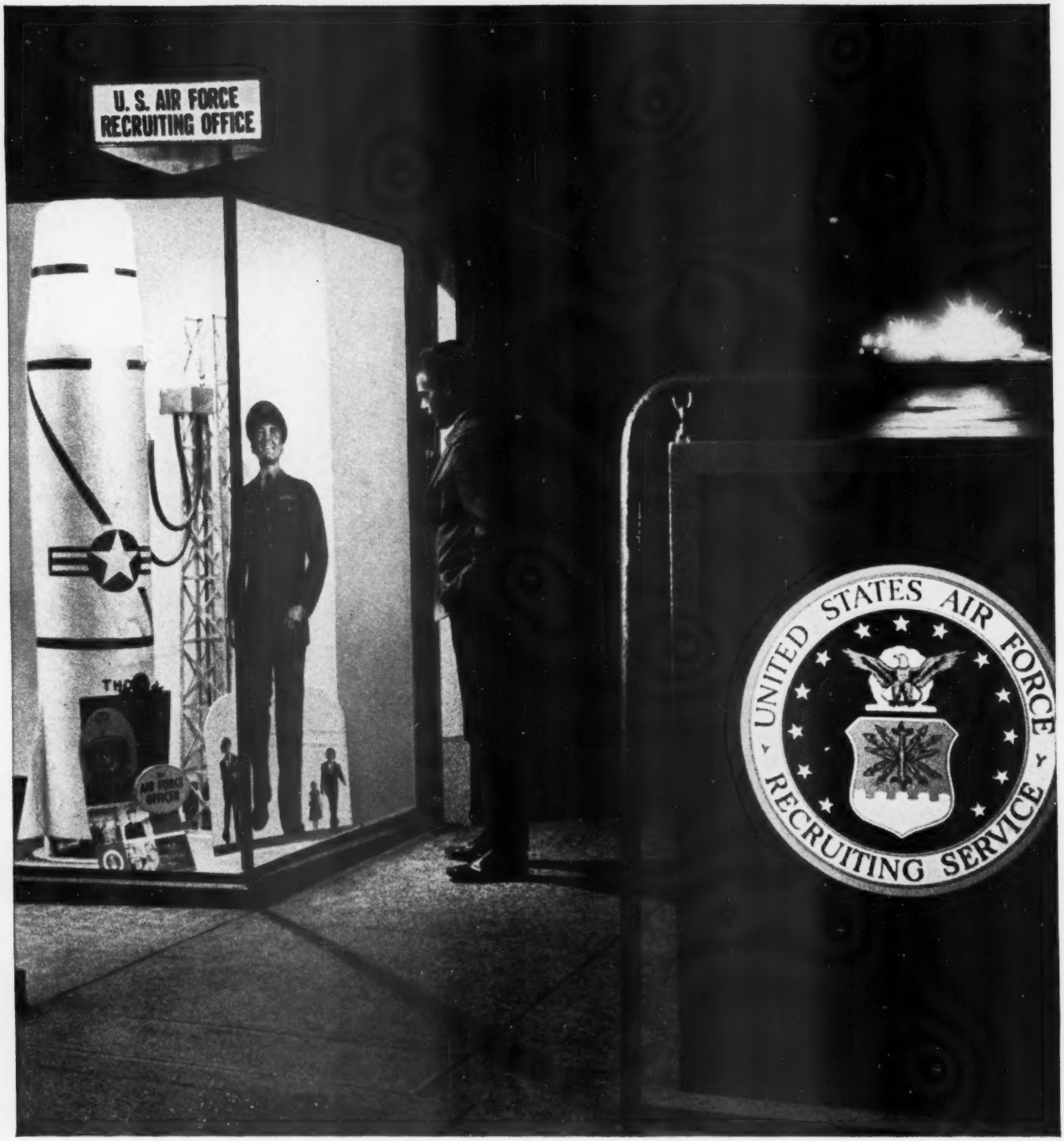

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INDEX TO ADVERTISERS

AC Spark Plug, the Electronics Div. of General Motors 66
Aeronutronic, a Div. of Ford Motor Co. ..... 82 and 83
Aerospace Corp. 88
AiResearch Mfg. Co., Div. of Garrett Corp. 1
American Machine & Foundry Co., Government Products Group 29
American Telephone & Telegraph Co. 30
Antelline Constructors, an Affiliate of Fred F. Antelline, Inc. 110
Arma Div., American Bosch Arma Corp. ..... Cover 2
Astrodata, Inc. 103
AVCO Corp. 84
Babcock Electronics Corp. 124
Bell Aerospace Corp. ..... Cover 3
Bendix Computer Div., Bendix Corp. 19
Bendix Products Div., Bendix Corp. 99
Bendix Corp., Red Bank Div., General Products Dept. 24
Caterpillar Tractor Co., Defense Products Dept. 104
Clifton Precision Products Co., Inc. . 51
Delco Radio, Div. of General Motors Corp. 127
Del Mar Engineering Labs. 100
Dorsett Electronics Labs., Inc. 117
Eclipse-Pioneer Div., Bendix Corp. . 2 and 3
Fairchild Camera & Instrument Corp., Defense Products Div. 92
Ford Instrument Co., Div. of Sperry Rand Corp. 70
Francis Aviation 124
FXR, Inc. 102
General Dynamics/Electronics, Military Products Div. 13
Government Products Group, American Machine & Foundry Co. 29
Hoffman Electronics Corp. 107
Hughes Aircraft Co. ..... 14 and 15
IT&T, Federal Laboratories 87
Lenkurt Electric Co., Sub. General Telephone & Electronics Corp. 52 and 53
Librascope Div., General Precision, Inc. 38
Litton Systems, Inc., a Div. of Litton Industries 37
Lockheed Aircraft Corp., Georgia Div. ..... 10 and 11
Lockheed Aircraft Corp., M&SD ... 59
McDonnell Aircraft Corp. ..... Cover 4
MITRE Corp., The 91
Monsanto Chemical Co., Organic Chemicals Div. ..... 112 and 113
Motorola, Inc., Military Electronics Div. 118
Northrop Corp. 22
Puritan Compressed Gas Corp. 123
Raytheon Co., Equipment Div. 108
RCA Defense Electronic Products, Radio Corp. of America ..... 34 and 35
RCA Industrial Electronic Products, Radio Corp. of America 114
Remington Rand Univac, Div. of Sperry Rand Corp. 33
Republic Aviation Corp. 63
Ryan Aeronautical Co. 26
Sikorsky Aircraft Div., United Aircraft Corp. 111
Sperry Electronic Tube Div. ..... 6 and 7
Tamar Electronics, Inc. 116
Texas Instruments Incorporated 21, 23, 25, and 27
Thiokol Chemical Corp., Rocket Div. 64 and 65
Thompson, H. I., Fiber Glass Co. .. 60
United Technology Corp. 122
US Air Force 36
Vertol Division Boeing 121
Westinghouse Electric Corp., Defense Products Group ..... 16 and 17

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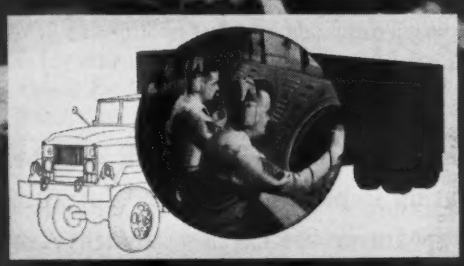

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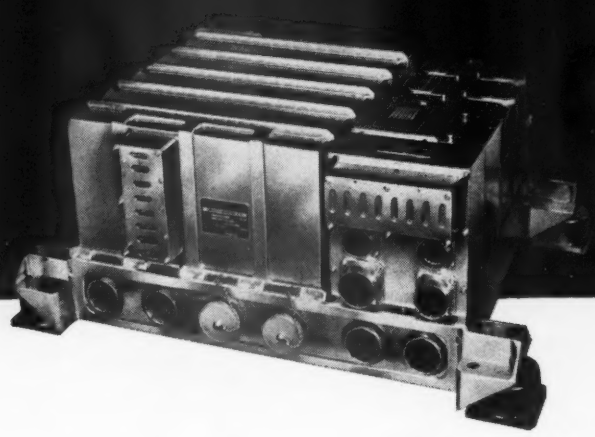

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GENERAL PRECISION

AIR FORCE
NOVEMBER 1961

AFA's Fifteenth Anniversary National Convention and Aerospace Panorama at Philadelphia in September provided, once more, a major sounding board for the prime issues of free-world security and an impressive, educational display of hardware . . .

NATIONAL CONVENTION 1961

By Frederic M. Philips
ASSOCIATE EDITOR, AIR FORCE MAGAZINE

Philadelphia Fire Department hoses down a USAF Titan ICBM on display downtown.

THE AIR Force Association's Fifteenth Anniversary National Convention and Aerospace Panorama was held at Philadelphia, Pa., from September 20 through 24.

Once more, the Convention provided a major sounding board for the prime issues of free-world security. Top Air Force officers headed by Secretary Eugene Zuckert and Chief of Staff Gen. Curtis E. LeMay, government officials, industrial executives, prominent educators, other leaders of the world of space and flight took part. The Panorama presented an eye-opening display of aerospace hardware, including major weapon systems.

President John F. Kennedy sent a letter to the Convention praising AFA's past contributions to the nation's security, asking "continued support" in the future, and pledging US determination "to deter aggression but also, if necessary, to fight and win against it." *(See page 9 for text.)*

AFA, in a sense both sponsor and participant at its Conventions, issued a ringing Statement of Policy (*see page 8*) calling for realistic orientation of national strategy in line with modern weaponry and development of military space capabilities. The Association also elected a distinguished new president, passed a string of resolutions bearing on public issues, Reserve Forces affairs, and internal organization matters, and presented its annual awards.

These were the highlights of the Fifteenth Anniversary National Convention and Aerospace Panorama:

• **GENERAL LE MAY** addressed himself in a major speech to the need for "aerospace unity" within the Air Force.

Declaring that "swift and positive action" is necessary "to maintain our unity of mission and unity as an organization as we approach operational tasks in space," USAF's Chief of Staff said that these were three current essentials for the Air Force: modernization in line with technological advance, flexible and diversified forces that have a war-waging and war-winning capability, unity within the service recognizing that all elements "contribute to the aerospace power that is vital for our defense." (*See page 62 for the full text of General Le May's speech.*)

• **SECRETARY ZUCKERT,** in another major speech, called the Air Force a "great reassurance" in "a world of nuclear blackmail." He outlined the diverse Air Force role in troop airlift, ground-troop support, strategic manned and unmanned striking power. Then, turning to "the frontiers of space," the Secretary stated firmly: "We cannot allow any power to dominate outer space with the implications that such space superiority could lead to military disadvantage to this country." *(See page 58 for full text.)*

• **SPACE AND NATIONAL SECURITY** received a searching—and grim—examination from an impressive panel group at the Convention's Annual Symposium. *(For full text see page 71 and following.)*

Participants in the Symposium were: TREVOR GARD-

(Continued on following page)

Retired USAF Gen. James H. Doolittle, the outgoing AFA board chairman, Howard T. Markey, and Association's new president, Joseph J. Foss, in conversation at Convention.

Airpower achiever-visionary Doolittle received crystal ball at Awards Banquet, delivered this meaningful talk to group.

I would like to congratulate the Air Force Association on a fine job well done over the past fifteen years. The Association has grown and prospered, but its growth and prosperity were but a means to an end. That end was service—to aviation in general and to the Air Force but, above all, public service to the nation. This it has rendered in bounteous measure.

As I look into my crystal ball, the future appears cloudy and turbulent. I see the next six months as a period of intense negotiation. Our negotiators must be adroit, patient, fair, and firm. They can either improve our position vis-à-vis the Soviets or they can negotiate away our national birthright of freedom. They may compromise but never appease. The compromise of basic principles is appeasement, appeasement is defeat, and defeat in this conflict is death.

I see the year ahead—1962—as a year of decision, the "moment of truth" for the United States and for the world. This is the period when our missile position—relative to that of the Soviets—is probably most unfavorable to us and hence the time of greatest temptation to them.

Thereafter I see a gradual shift in the power equation in our favor and hence a lessening of the chances for general war.

This presumes that we forge ahead—full out—increasing our defensive and offensive military strength. For only through military strength can we avoid war.

While we may avoid general war with the Soviets through our military strength, we cannot avoid continued conflict with them—not unless they alter their avowed objectives of world communization and world domination. The conflict presently is ideological and technological—and will soon become economic. The conflict will continue until one side prevails.

I see a new national requirement to meet and master this threat. This requirement calls for:

- A revival of national morality.
- A renewal of national pride and patriotism.
- Finally, a willingness, as a nation, to work harder and sacrifice as necessary.

If we meet this national requirement—if we do these things—I see freedom flourishing. For I am sure that this great nation, which we all love, can beat the Soviets—in any line of endeavor—if we exert our best effort.

We must pray that God may give our President and our people courage, wisdom, and strength so that—through inspired efforts—we may survive and prevail.—END

NER, former Assistant Secretary of the Air Force (R&D) and now president of the Hycon Manufacturing Company; DR. EDWARD C. WELSH, executive secretary of President Kennedy's National Aeronautics and Space Council; DR. WALTER F. DORNBERGER, wartime German rocket pioneer, now vice president and chief scientist of the Bell Aerosystems Company; CONGRESSMAN EMILIO Q. DADDARIO of Connecticut, a member of the House Science and Astronautics Committee; and GEN. BERNARD A. SCHRIEVER, commander of the Air Force Systems Command.

Mr. Gardner warned that the nation faces "an imminent and dangerous Soviet space threat."

"Our President has already committed the nation to a major national effort in space exploration," he said. "Our national leaders are now confronted with the need for a similar commitment with respect to US military space superiority."

Dr. Welsh said that "we are in a space race . . . not in the contest just for the fun of racing but rather for our survival as a nation."

Dr. Dornberger declared that "space will be conquered for scientific, political, prestige, propaganda, economic, and military reasons. All are interrelated. All are important. But I think the military reason is the only vital one."

Congressman Daddario, observing that a true threat exists in Russian space capabilities, espoused a concerted, unified national effort in space development. "I submit that beyond the question of exploration of this environment," he said, "must always lie the question of how man can control the uses of that environment to enhance his own security and well-being."

The final participant, General Schriever, spoke of Air Force capabilities and potentialities in the space environment, concluding: "When the Strategic Air Command was formed, the people of America understood that Airpower Is Peace Power. We need a clear understanding today that Spacepower Is Peace Power."

- **PRESIDENT KENNEDY,** in his letter of greetings to the Convention, noted that "we face, in the short run and the long, a wide range of military and diplomatic challenges by a strong and determined adversary. We must be prepared to respond to these challenges across a wide spectrum of military capability, taking full advantage of the flexibility and effectiveness of modern weaponry to deter aggression but also, if necessary, to fight and win against it."
- **AFA's STATEMENT OF POLICY** hit hard at those who today contend the national policy of nuclear deterrence is outmoded: "The overriding priority of the day must be the unquestioned credibility of our nuclear deterrent. This credibility has been undermined by Soviet confidence in its own rising strength and by Soviet belief that the United States is unwilling to engage in nuclear war in behalf of freedom."

"To attain the level of national power needed," AFA declared, "the energies and talents of the American people must be mobilized on new terms. We

therefore petition the President to declare a national alert—a new and higher level of national effort."

• **FOUR AIR FORCE BRIEFINGS** were presented by top Air Force officers headed by GENERAL LEMAY.

The first, on "Aerospace Manpower Requirements," stressed the fact that skilled manpower is a prime key to military strength even in this age of far-out weapon systems. Participants were: LT. GEN. EDWARD J. TIMBERLAKE, Deputy Chief of Staff, Personnel, USAF; MAJ. GEN. ALBERT P. CLARK, Director of Military Personnel, DCS/Personnel USAF; MAJ. GEN. JAMES V. EDMUNDSON, Director, Personnel Procurement and Training, DCS/Personnel; and BRIG. GEN. HENRY G. THORNE, JR., Director of Personnel Planning, DCS/Personnel.

General Timberlake set the theme with the assertion that "man is the universal subsystem." He told the group, "No matter what the scientists and engineers are working on today for the Air Force of the future, they must incorporate a common universal subsystem into their designs. They have to get down to the man who is going to make the things work."

GENERAL LEMAY and top members of his Air Staff conducted the second briefing session. Along with the Chief, the participants were: MAJ. GEN. A. BURCHINAL, Director of Plans, DCS/Plans and Programs; LT. GEN. JOHN K. GERHART, DCS/Plans and Programs; LT. GEN. EDWARD J. TIMBERLAKE, DCS/Personnel; MAJ. GEN. VICTOR R. HAUGEN, Assistant DCS/Research and Technology; MAJ. GEN. JOHN HESTER, Deputy DCS/Operations; BRIG. GEN. JULIAN H. BOWMAN, representing the Comptroller, USAF; and MAJ. GEN. ARNO H. LUEHMAN, Director of Information, USAF.

General Burchinal, in the background statement for this briefing, said that the Air Force sees "warning flags" flying in the world as a result of the fast pace of Russian development. Now, he said, we must make a major technological and defense development effort for survival.

USAF's Director of Plans declared:

"The Air Force believes that it can and must protect from enemy attack the population, institutions, cities, and industry of the United States. It is not an easy job in the years ahead, but it must be done. We see this as our basic task; we believe we can and must maintain a war-winning force—a force that even in retaliation can seek out and destroy enemy forces and weapons before they can deliver their warheads on US targets. It is clear that if we achieve this capability, we will continue to have the strongest possible deterrent to aggression, for only a force than can win —that can deny effectiveness to the opposing military force—can deter. The job involves both our strategic air forces and our air defense forces. . . ."

The third panel of major commands took up the subject, "Aerospace Force of Today." Participants were GEN. FRANK F. EVEREST, Commander, Tactical Air Command; LT. GEN. ROBERT M. LEE, Commander, Air Defense Command; LT. GEN. JOE W. KELLY, Commander, Military Air Transport Service; MAJ. GEN. HEWITT T. WHELESS, representing the Commander in Chief of the Strategic Air Command, Gen. Thomas S. Power; and LT. GEN. JOHN K. GERHART, DCS/Plans and Programs.

These officers inventoried their forces and capabilities today, their needs and plans for tomorrow in terms of new hardware, new technological breakthroughs in airlift, transport, tactical, and strategic systems.

President Foss, former USAF Chief of Staff and Chairman of Joint Chiefs of Staff, retired Gen. Nathan F. Twining, former Air Force Secretary James H. Douglas, at function.

The closing briefing dealt directly with the subject, "Aerospace Force of Tomorrow," with these participants: GEN. BERNARD A. SCHRIEVER, Commander, Air Force Systems Command; GEN. WILLIAM F. MCKEE, Commander, Air Force Logistics Command; LT. GEN. JAMES E. BRIGGS, Commander, Air Training Command; BRIG. GEN. THEODORE C. BEDWELL, JR., Commander, Air Force Aerospace Medical Center; MAJ. GEN. VICTOR R. HAUGEN, Assistant DCS/Research and Technology.

Looking toward tomorrow, General Schriever saw advances in space as well as manned aircraft types as the essentials of aerospace progress. General McKee centered his talk on AFLC's current advances in logistics operations and preparations for space logistics missions in the future.

ATC's General Briggs stressed urgent shortages of skilled personnel facing today's technological Air Force and the difficult problems of meeting these deficiencies among both officers and airmen. General Bedwell spoke of the Air Force's advanced position in aerospace medicine and said he was "confident" that the record of progress in this area would remain a proud one.

• **AFA DELEGATES ELECTED** JOSEPH J. FOSS of Sioux Falls, S.D.—Air National Guard brigadier general, World War II Congressional Medal of Honor winner as a Marine Corps fighter pilot, former governor of South Dakota, and president of the American Football League—to be president of the Association for the coming year. Mr. Foss was chosen to succeed San Francisco attorney THOS. F. STACK, who was elected chairman of the Board of Directors. Mr. Stack succeeds outgoing Board Chairman Howard T. Markey, his predecessor as AFA's president.

AFA's incumbent treasurer, JACK B. GROSS, of Harrisburg, Pa., and national secretary GEORGE D. HARDY of College Park, Md., were reelected to their offices.

Mr. Foss, leading Marine fighter ace in the Pacific in World War II, served two terms as governor of

(Continued on following page)

his home state after his return to civilian life in 1946. At the same time he joined the South Dakota Air National Guard, assumed command of the Air Guard in his state. He also became active in the Air Force Association, organizing two Association Squadrons in South Dakota and becoming commander of the South Dakota Wing.

At present, Mr. Foss divides his time between Sioux Falls, S.D., and Dallas, Tex., where he maintains his office as first president of the young American Football League. He has also been president of the National Society for Crippled Children for the past two years. Mr. Foss is married and the father of three children.

Mr. Stack, who now moves from president to board chairman of the Air Force Association, was the original organizer of AFA units in San Francisco and the rest of California. He has held successive elected AFA posts for the past sixteen years.

Mr. Gross, who remains treasurer, also has many key AFA positions behind him. He organized the Olmsted, Pa., AFA Squadron, and has been extremely active in local and state AFA activities. He has previously served two terms as treasurer.

Mr. Hardy, who now begins his third term as secretary, has been both national vice president and director of AFA in the past.

Also elected by the Convention delegates at their second business session were directors and national vice presidents for the coming year. These are listed on page 106 of this issue.

Convention delegates from across the country also passed twenty-four resolutions dealing with public issues, internal Association policies, and Reserve Forces affairs. The thirteen that dealt with public issues:

1. Called for a dynamic civil defense program.
2. Urged the National Aeronautics and Space Administration to devote increased attention to aeronautical research.
3. Recommended higher rental and subsistence allowances for Reserve enlisted men.
4. Called for a full-scale, development-and-production B-70 program.
5. Suggested that Congress increase quarters allowances for military personnel.
6. Supported a bill before Congress to raise enlisted men's retirement pay.
7. Favored a switch to forty-eight pay drill periods a year for all Ready Reserves.
8. Supported a modified version of a permanent accrual flight pay system embodied in a bill before Congress.
9. Called for alert pay for SAC, ADC, and other commands whose personnel stand alert duty.
10. Recommended to DoD a strengthened indoctrination course in communism for inductees.
11. Urged emergency legislation to provide economic relief for Berlin crisis recallees and guarantee their jobs on return to civilian life.
12. Set forth the national need for a Mach 3 transport aircraft and called for congressional, FAA, NASA, and industry cooperation in this development.
13. Argued for an end to current government restrictions on employment of retired military personnel in defense industry.

Remaining resolutions passed, pertaining to AFA "family" affairs, are treated in "AFA News," starting on page 105. Reserve resolutions are covered further in "Ready Room," beginning on page 97.

• **MAJOR AIRPOWER AWARDS** went at the Convention to significant contributors in fields of aerospace development.

LYLE S. GARLOCK, Assistant Secretary of the Air Force for Financial Management, was named "Airpower's Man of the Year." Mr. Garlock received the Association's H.H. Arnold Trophy in recognition of his "contributions to national security" through twenty-five years of public service, most of it in the field of financial management.

The three primary test pilots in the X-15 experimental rocket plane program, USAF MAJ. ROBERT M. WHITE, North American Aviation's SCOTT CROSSFIELD, and the National Aeronautics and Space Administration's JOE WALKER, jointly received the David C. Schilling Trophy for contributions in the field of flight in recognition of their "high achievement and great heroism" in taking the X-15 to successive new records in speed and altitude.

Retired Air Force MAJ. GEN. ORVIL A. ANDERSON, president of the Air Force Historical Foundation at Maxwell AFB, Ala., and Foundation historian DR. ALBERT SIMPSON, were awarded AFA's Annual Arts and Letters Trophy in recognition of their "professional and dedicated leadership in building the Air Force Historical Foundation program of scholarship."

ALLEN F. DONOVAN, Senior Technical Vice President of the Aerospace Corporation, nonprofit Air Force technical management organization at El Segundo, Calif., was recipient of AFA's annual Science Trophy in recognition of his role as "a principal architect of ideas for the utilization of space technology as a vital extension of our nation's military capabilities."

The Vandenberg Trophy for contributions in the field of education went to DR. CHARLES H. BOEHM, Superintendent of Public Instruction of the Commonwealth of Pennsylvania, for "providing Pennsylvania's youth with a newly established space-age oriented Earth and Space Science course that has earned wide approbation from fellow educators across the country and enthusiastic acceptance by students and teachers in his own state."

Also honored at the Convention were the twenty outstanding airmen of the United States Air Force representing Commands around the world. The honored men were: CMSGT. JAMES M. ALLBROOKS, Air Force Systems Command; SMSGT. HAROLD S. BLUME, USAF Academy; MSGT. CARL L. BOWEN, JR., Continental Air Command; CMSGT. JAMES D. CAUSEY, Pacific Air Forces; SMSGT. ALVA L. DANIELS, Air Force Accounting and Finance Center; MSGT. KING K. FRAZIER, Air University; SSGT. CECIL R. GILLIS, United States Air Forces in Europe; SMSGT. JACK O.

(Continued on page 44)

From X-15 p Allen

Top r Friedr friend

From left above, H. H. Arnold Trophy winner as "Airpower's Man of the Year," Lyle S. Garlock; Flight Trophy winners, X-15 pilots Joe Walker, Bob White, and Scott Crossfield; Arts and Letters Trophy winners Anderson and Simpson; Dr. Allen F. Donovan, winner of the Science Trophy; and Dr. Charles H. Boehm, winner of the Hoyt S. Vandenberg Trophy.

Top row from left: Trevor Gardner; Roy Neal; Maj. Gen. Oliver Niess; Joe E. Brown; Milton Caniff; Maj. Gen. Robert J. Friedman, flanked by Tom Stack and Arthur Godfrey. Bottom row, from left: Vince Barnett with George Gobel and a friend; the Air University briefing team; Utah's Bob Stewart; and Chico Squadron's Sankey Hall, Jr., with Tom Stack.

AIR FORCE ASSOCIATION AWARDS

AIRPOWER AWARDS

Hon. Lyle S. Garlock, Assistant Secretary of the Air Force for Financial Management, "Aviation's Man of the Year"—H. H. Arnold Trophy.

Maj. Robert M. White (USAF), **Scott Crossfield** (North American Aviation), **Joe Walker** (NASA)—David C. Schilling Trophy.

Maj. Gen. Orvil A. Anderson, USAF (Ret.), President, Air Force Historical Foundation, and **Dr. Albert Simpson,** Chief, Historical Division, Air University—AFA Arts and Letters Trophy.

Allen F. Donovan, Senior Technical Vice President, Aerospace Corp.—AFA Science Trophy.

Dr. Charles H. Boehm, Superintendent of Public Instruction for the Commonwealth of Pennsylvania—Hoyt S. Vandenberg Memorial Trophy.

CITATIONS OF HONOR

Maj. Gen. Robert E. L. Eaton, USAF, Assistant Chief of Staff for Reserve Forces.

Trevor Gardner, Hycon Manufacturing Co.

Roy Neal, television producer, National Broadcasting Co.

Maj. Gen. Oliver K. Niess, Surgeon General, USAF.

Maj. Gen. Robert J. Friedman, Deputy Chief of Staff, Comptroller, AFSC.

Joe E. Brown, motion-picture personality.

Milton Caniff, syndicated cartoonist.

Vince Barnett, restaurateur-comedian

The Air University, for its Aerospace Briefing Team.

THE PRESIDENT'S TROPHIES

Robert P. Stewart, Utah—AFA's Man of the Year.

Chico, Calif., Squadron—AFA's Squadron of the Year.

UNIT EXCEPTIONAL SERVICE PLAQUES

Pittsburgh, Pa., Squadron—Programing.

Union-Morris, N. J., Squadron—Community relations.

Mobile, Ala., Squadron—Membership.

Utah Wing—Aerospace education.

INDIVIDUAL EXCEPTIONAL SERVICE PLAQUES

Charles O. Morgan, Jr., San Francisco, Calif.

James C. Snapp, Jr., La Mesa, Calif.

William W. Spruance, Wilmington, Del.

Donald J. Strait, Bedminster, N. J.

James M. Trail, Boise, Idaho

David F. McCallister, Swarthmore, Pa. (posthumously)

Barnie B. McEntire, Jr., Columbia, S. C. (posthumously)

MEDALS OF MERIT

Carl C. Alford, Glendale, Calif.

William L. Bromirski, Jr., Jersey City, N. J.

Vito J. Castellano, Armonk, N. Y.

William P. Gilson, Sacramento, Calif.

Willard A. Hawkins, Little Rock, Ark.

Dale J. Hendry, Nampa, Idaho

Joseph C. Jacobs, Bountiful, Utah

Maxwell A. Kriendler, New York, N. Y.

Ronald B. McDonald, San Pedro, Calif.

M. L. McLaughlin, Dallas, Tex.

James C. McPartlin, Grandview, Mo.

John B. Montgomery, Murray Hill, N. J.

Italo Quinto, Stirling, N. J.

Roy T. Sessums, New Orleans, La.

Stephen C. Yednock, Harrisburg, Pa.

AFA-AFLC MANAGEMENT AWARDS

Maj. Gen. George E. Price—Distinguished Management Award.

Col. Norman C. Spencer, Jr.—General Management Award.

Col. Ben J. Peck—Supply Management Award.

Wallace L. Horton—Maintenance Engineering Management Award.

Col. Stephen P. Dillon—Procurement and Production Management Award.

RESERVE FORCES AWARDS

Capt. Robert Reardon, Van Nuys, Calif.—Earl T. Ricks Memorial Trophy.

445th Troop Carrier Wing, Dobbins AFB, Ga.—Outstanding Air Reserve Unit.

163d Tactical Fighter Squadron, Fort Wayne, Ind.—Outstanding Air National Guard Unit.

GLENN, Air Force Security Service; CMSGT. GRENDELL E. HAWES, Air Training Command.

Also, CMSGT. PAUL C. JACKSON, Military Air Transport Service; MSGT. LEWIS J. JONES, Strategic Air Command; MSGT. RONALD B. MCDONALD, Air Force Reserve; SMSGT. HAROLD E. MERRYMAN, Headquarters Command; CMSGT. ROBERT B. MORRIS, Air Defense Command; MSGT. CARROLL W. OLIFF, Air Force Logistics Command; TSGT. GORDON E. PHILLIPS, Alaskan Air Command; MSGT. HAROLD F. RENNEBERG, JR., Caribbean Air Command; MSGT. RAYMOND L. SHANNON, Air National Guard; SMSGT. DOC H. TAKEDA, Tactical Air Command; TSGT. WILLIAM A. WOOD, Air Force Communications Service.

Above, outgoing Board Chairman Howard T. Markey, President Thos. F. Stack, Arthur Godfrey, Chief of Staff Gen. Curtis E. LeMay at Convention Anniversary Luncheon. At upper right, twenty Outstanding Airmen from all of USAF's Commands around the world who were guests of AFA through the Convention. They are holding mockup of B-70 Mach 3 bomber. Outstanding Airmen's Luncheon honored group of senior noncoms. Lower right, Hughes Trophy goes to "top aerial defense team in the free world," Air Force's 83d Fighter-Interceptor Squadron of Hamilton AFB, Calif. Gen. Robert M. Lee, commander of Air Defense Command, stands third from left. The squadron commander, Lt. Col. Arthur W. Owen, stands beside him behind the trophy, presented to squadron at Night Fighters Association reunion luncheon.

Other Convention award winners, including the important AFA Family Award recipients, are reported in "AFA News."

• **THE AEROSPACE PANORAMA,** inside and outside Philadelphia's Convention Hall, was once again massive, impressive, and educational. Major items in it included Hound Dog and Skybolt air-launched missiles, an X-15 rocket plane, a Sergeant short-range Army missile, a Bomarc air defense missile, a large model of the B-70 Mach 3 bomber, and a Project Mercury space capsule. On display a few blocks away in the heart of downtown Philadelphia was a Titan ICBM. One extremely interesting exhibit was the Marsflight simulator, a spaceship model displayed by a group of seven youngsters from St. Petersburg, Fla., who built it at a cost of $500 with the help of local industry and engineers.

The extraordinary Panorama display, as General LeMay said in a speech, "seems to get better every year." This year's included 200 exhibits by industry, the Air Force, and government agencies. It covered 150,000 square feet of floor space. Close to 100,000 persons flocked to Convention Hall to see the Panorama when it was opened to the public on Saturday and Sunday, September 23 and 24.

• **AEROSPACE EDUCATION,** a topic more and more vital to national strength with the passage of years and one to which AFA has devoted major attention, was spotlighted by events through the Convention. A seminar on the subject included panelists DR. LEONARD S. SHEINGOLD, USAF Chief Scientist; DR. GEORGE E. VALLEY, Professor of Physics, MIT; DR. IVAN GETTING, President, Aerospace Corporation; and DR. LINDLEY STILES, Dean, College of Education, University of Wisconsin. GEN. FREDERIC H. SMITH, USAF's Vice Chief of Staff, addressed an aerospace education luncheon at which DR. LAWRENCE G. DERTHICK, Assistant Executive Secretary of the National Education Association and former US Commissioner of Education, was toastmaster.

General Smith, in one of his first public appearances since assuming his present post, stressed the almost complete dependence a modern-day Air Force places on the educational competence and training of its personnel—and how the requirement for highly educated personnel will grow and grow.

Participating in aerospace education programs of the Convention were hundreds of top educators from across the country and more than two thousand selected college and high school students. The educational program at the Convention was sponsored by the Aerospace Education Foundation.

One major educational event saw some 1,500 selected high school students and teachers from Pennsylvania, New Jersey, and Delaware guided through the Convention's giant Aerospace Panorama. The students and teachers, attending at the invitation of AFA and Pennsylvania's Superintendent of Public Instruction, Dr. Charles H. Boehm, arrived at Philadelphia's Convention Hall by the busload.

These guests were conducted through the Panorama by 150 Air Force ROTC Cadets. The Cadets were chosen for this duty from the Arnold Air Society, Cadet affiliate of the Air Force Association at 162 colleges and universities. In all, more than 500 Arnold Air Society members attended the Convention in their annual Conclave, held in conjunction with the AFA meeting. Students and teachers received a briefing on space technology by an Air Force team from the Air University, Maxwell AFB, Ala.

Among those attending the Aerospace Education Seminar were approximately 150 educational administrators from more than thirty states, including state superintendents of public instruction, state Parent-Teachers Association and school board heads, heads of state education associations, and deans of state teachers' colleges.

This same group attended an Aerospace Education Workshop at which participants in a discussion of the "Impact of Aerospace Technology on the School System" were Dr. Paul H. Masoner, Dean of the College of Education, University of Pittsburgh; Dr. M. Marcus Kiley, Deputy Superintendent of Schools, Springfield, Mass.; Dr. William B. Edwards, Superintendent of Schools, Lakewood, Ohio; and Dr. Frank E. Sorenson, Professor of Education, University of Nebraska.

• **RESERVE PARTICIPATION** in the Convention centered around a Reserve Forces Seminar with an all-star cast and packed attendance. The Air National Guard Ricks Trophy competition kicked off the Convention as usual. This year's Ricks event was a transpacific and transcontinental run in which six Guard C-97 four-engine transports were initially entered. An aircraft of the California ANG's 195th Air Transport Squadron won.

"Ready Room" (*page 97*) reports this month on the Ricks event and other Reserve activities that took place at the City of Brotherly Love.

Again, AFA had its biggest Convention; each year, the registration grows. There were some 4,200 registrants at Philadelphia. The Convention once again was an outstanding success in all aspects, thanks to participants, exhibitors, the host Philadelphia AFAers, and a well-run Convention organization, top to bottom.

The organization, working under Convention General Chairman and then-AFA President Thos. F. Stack, included: Robert C. Duffy, General Chairman of Committees; Alfred L. Wolf, Chairman—Civic Affairs; Brig. Gen. John S. Bagby, Chairman—Military Affairs; Victor H. Blanc, Vice Chairman—Civic Affairs; Col. Edgar R. Owens, Vice Chairman—Military Affairs; Sally Downing, Reception Committee; Richard P. Hart, Panorama Committee; Herb Greenfeder, Arrangements Committee; W. Neal Lang, Newsroom Committee; Cap Carn, Information Committee; Anthony Galasso, Transportation Committee; Joseph Dougherty, Registration Committee; Maj. Gen. Donald L. Hardy and Maj. Gen. William P. Fisher, Military Hosts; Lt. Col. David B. O'Hara, Air Force Project Officer.—End

1961 CONVENTION SPONSORS

The Air Force Association is deeply grateful to the following firms for their support to the success of AFA's Fifteenth Anniversary Convention in sponsoring the events and activities listed below:

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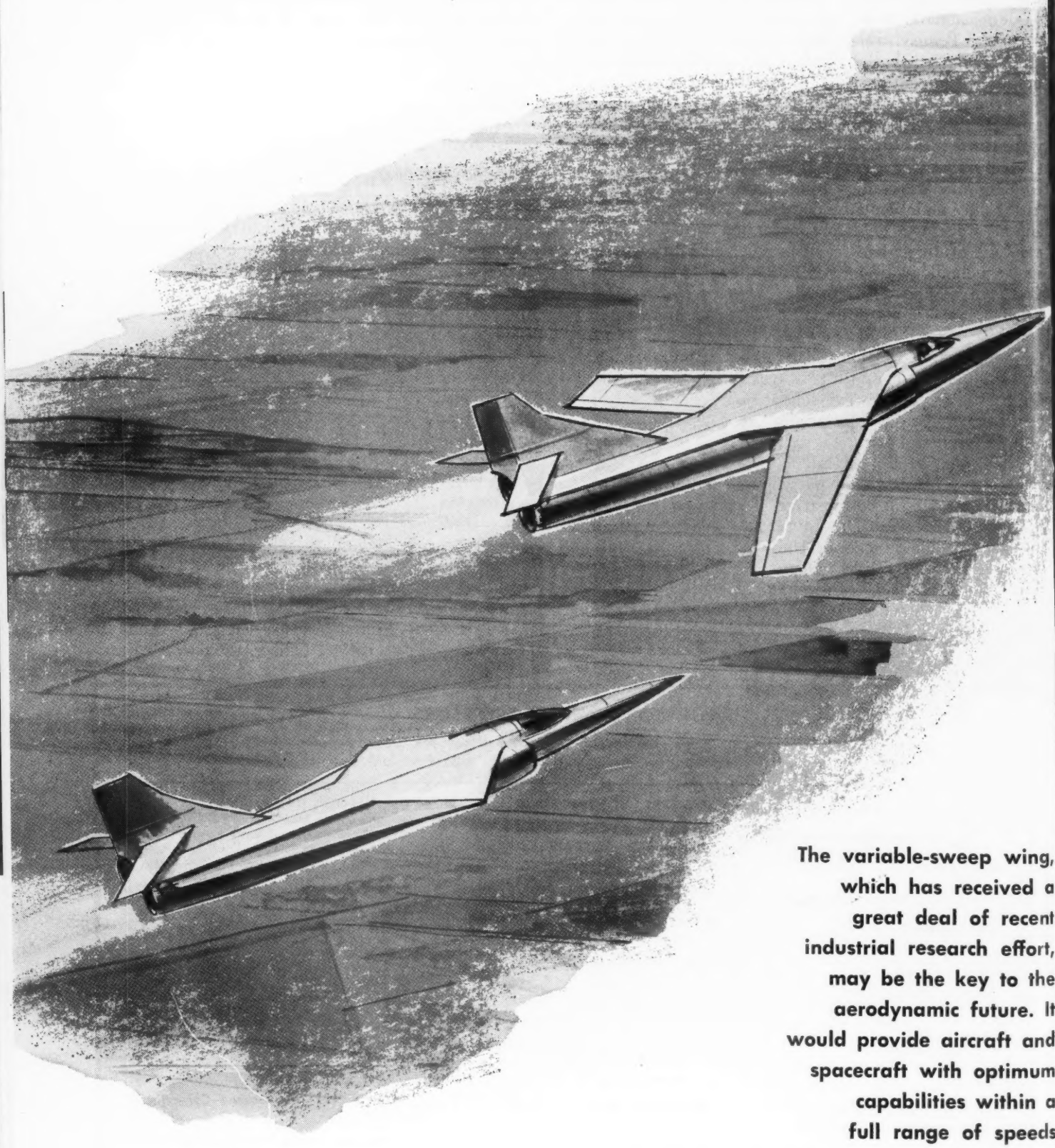
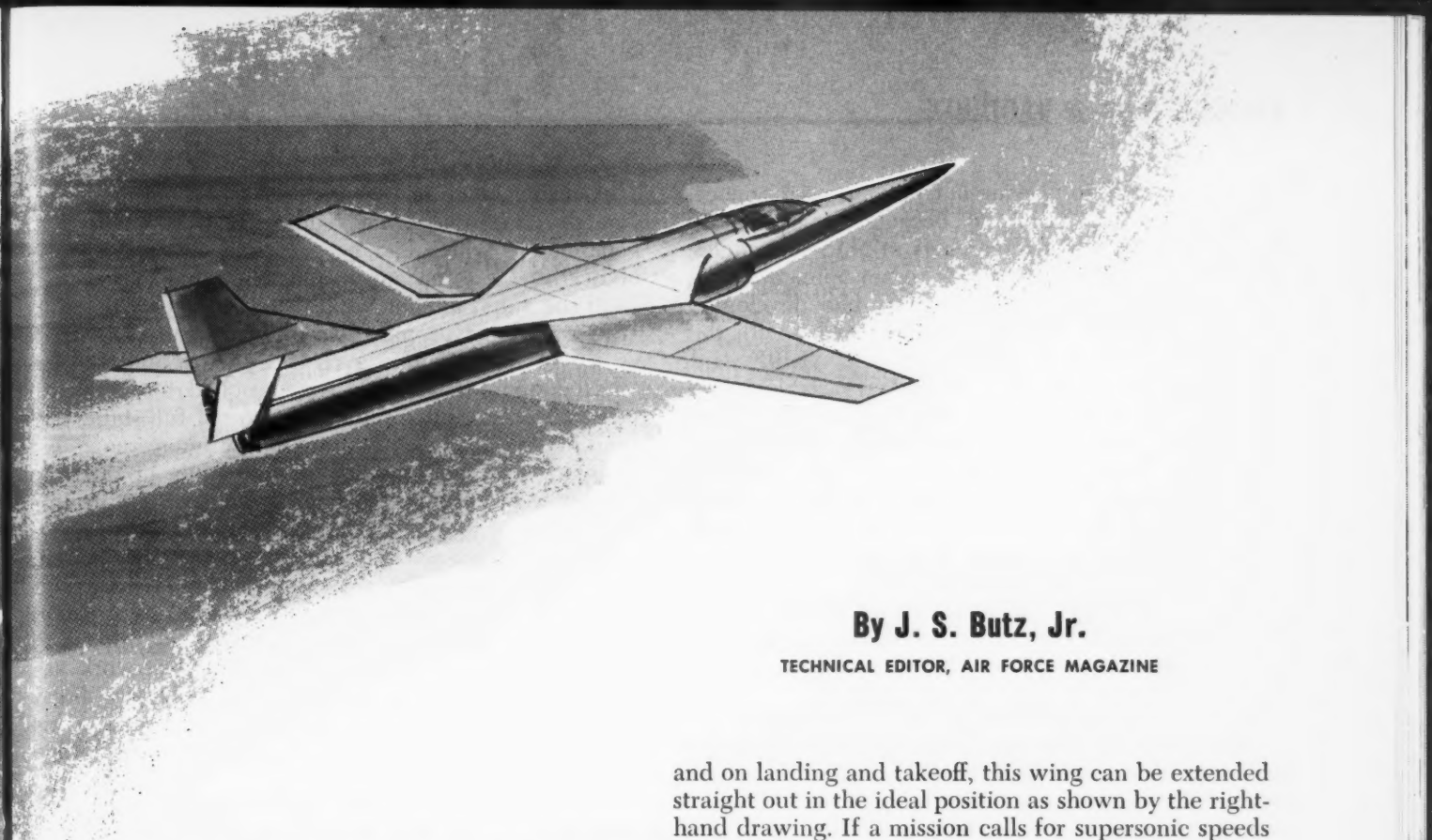
Arnold Air Society Ball Music

PROGRESS IS A VARIABLE



The variable-sweep wing, which has received a great deal of recent industrial research effort, may be the key to the aerodynamic future. It would provide aircraft and spacecraft with optimum capabilities within a full range of speeds and altitudes.



By J. S. Butz, Jr.

TECHNICAL EDITOR, AIR FORCE MAGAZINE

AVIATION is on the eve of a technical revolution comparable to the advent of the turbojet engine. Soon it will be possible for a single aircraft to achieve high performance in a wide variety of speed ranges and altitudes—through the use of the variable-sweep wing.

Variable sweep now permits airframe design to catch up with modern propulsion systems. Jet engines and rockets have made it possible to fly winged vehicles at extreme altitudes and speeds of several thousand miles an hour, but this flight capability has been purchased with some serious compromises in airframe performance.

The most damaging of these has been in wing design. It is patently impossible for one fixed-geometry wing to give the best possible performance at both subsonic and supersonic speeds. Good subsonic efficiency requires a long, narrow wing of moderate sweep and with a fairly thick airfoil. A good supersonic wing needs a thin airfoil, a short span, and a very high-sweep angle.

To date no really satisfactory marriage has been achieved between subsonic and supersonic wings, one that could provide low drag and long range at all altitudes and at both high and low speeds. Consequently, today's high-performance aircraft are designed to perform one particular mission. If circumstances force a deviation from the design mission, even for a few minutes, then the operational efficiency of these aircraft becomes marginal.

Variable-sweep-wing research now points a way out of the high-speed/low-speed dilemma. The hypothetical supersonic attack, reconnaissance, and air defense aircraft shown in the drawing on these pages illustrates the versatility of the new wing, as described to the Congress by NASA officials to explain the benefits of variable sweep.

During maximum-range flights at subsonic speeds, and on landing and takeoff, this wing can be extended straight out in the ideal position as shown by the right-hand drawing. If a mission calls for supersonic speeds at high altitudes, the wing can be pulled back to the optimum position for this type of flight, with a moderate sweep angle and span (*see the middle drawing*). When the wing is drawn all of the way back, with a sweep angle of more than ninety degrees and tucked into the fuselage (*left-hand drawing*), it is in the best possible position for a supersonic or transonic dash on the deck under defensive radar.

Most missions now performed by fixed-wing aircraft can be done better by use of variable-sweep wings—and within a decade. A typical industry prediction comes from a Boeing Airplane Co. spokesman: "Most future supersonic airplanes using runways for takeoff and landing will employ variable sweep. Subsonic airplanes with a requirement for extreme speed range [difference between takeoff and top speed] will use variable sweep. These are typical military requirements, and this means that variable sweep could become as common as flaps."

A Republic Aviation Corp. spokesman says: "We believe there will be general acceptance of the concept of variable-sweep wings in the future, and this acceptance will be about the same as flaps enjoy today."

Such predictions are based on a good deal more than paper studies. Most aircraft companies in the United States have spent a major portion of their own research funds during the last two years or so to get detailed answers on variable-sweep problems. This eloquent testimonial came after the industry completely reversed its original opinion of variable-sweep wings.

During the early and middle 1950s, the military and industry alike soured almost unanimously on variable sweep after the disappointing performance of two experimental aircraft—the X-5 and the XF10F. Both had stability problems, and their wing-sweep mechanisms were excessively heavy and complicated. And their forty-degree range of wing-sweep angles was

(Continued on following page)

not large enough to provide outstanding performance.

Variable sweep began to become respectable in August of 1959, when researchers at NASA's Langley Research Center asked industry for an opinion on the practicality of new information they had developed. This group, which was intimately involved with the X-5 project and close advisers on the XF10F, had never given up their effort to find a variable-sweep solution. By late summer of 1959 they believed they had answers to the weight and stability problems.

The new NASA information looked good enough that most companies began private studies to check the NASA conclusions and to develop the detailed information needed to prepare formal proposals for the military. Industry's interest has increased with time. Its broadening research effort, in combination with further NASA studies, has produced a well developed technology on variable-sweep wings during the last two years.

The enthusiasm was so great at Boeing, for example, that the company embarked almost immediately on one of the most extensive privately sponsored research and development programs ever undertaken on a single subject in the aircraft industry.

Boeing has averaged almost five hours of wind-tunnel tests every working day since August of 1959 in its variable-sweep wing program. Company wind-tunnel investigations at subsonic, transonic, and supersonic speeds now total more than 2,500 hours. In the early 1950s many new high-performance airplanes for the military did not receive this kind of experimental aerodynamic support.

Several specific military and civil airplane configurations have been investigated in the Boeing tunnel program in addition to seeking answers to a host of fundamental questions such as what general effect can be expected from changes in wing-sweep angle, wing loading, airfoil section, tail position, etc.

Early wind-tunnel work led to an experimental structural test program to determine exactly how much a full-scale, long-life, wing-sweep mechanism would weigh. One sweep mechanism was selected from among five which had been extensively studied analytically. This mechanism, plus the wing-root section and the outer, moving wing panel, was constructed in full scale, just as for an actual airplane. The wing stub was anchored to a rigid structure, and the expected operational loads were applied to the entire wing. Tests included the application of full static, taxi and landing loads, airloads, wing-tail interference due to wing bending, and an elaborate study of the type of flutter to be expected from a wing with a flexible joint.

A seventy-percent model of the sweep mechanism, with its bearing plates and support pins, was also built. This large model provided detailed information on bearing deflection, friction, and service life.

Boeing's aerodynamic and structural test work has convinced the company that it can actually build *lighter* airplanes if it uses variable-sweep wings. This holds true for the vast majority of military and airline missions under discussion today.

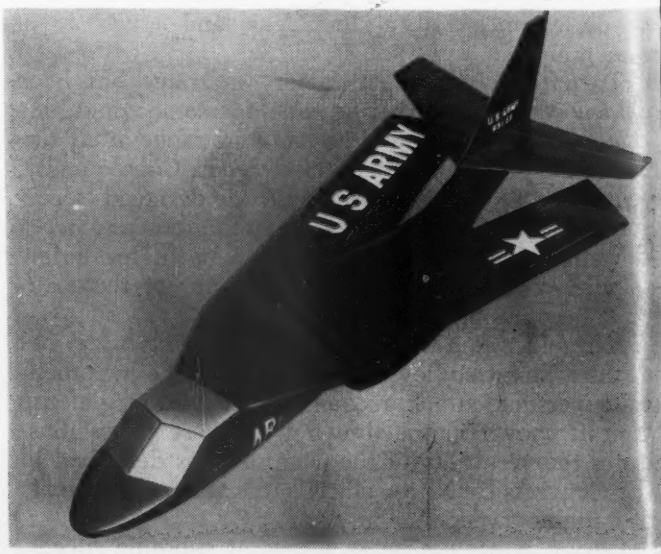
The moving wings add some structural weight to an airplane, but this increase is small compared to the weight savings in fuel made possible by the variable-sweep wing's superior aerodynamic efficiency and low drag at all flight speeds.

Boeing also concluded that all structural problems can be handled using information already available. Joints with sufficient stiffness to prevent flutter appear to be within the state of the art. Fatigue life is expected to be lower than that for conventional aircraft configurations for reasons discussed below. Bearings for the wing-sweep mechanism which have a satisfactory service life also are believed to be possible today.

Most aviation authorities agree in principle with Boeing's opinions on variable sweep. Congressional testimony by NASA engineers indicates that NASA's research program has produced very similar results.

The Boeing design below is intended to meet the Army's requirements for a long-range surveillance airplane. It has short-field-takeoff capability with the wings extended.

On Boeing designs the trailing edge is not pulled completely into the fuselage when the wing is swept back. Some firms pull the wing into the fuselage as much as possible.



No longer are there substantial arguments over the advisability of variable sweep. Most disagreements concern the proper aerodynamic and structural designs to be used on specific classes of aircraft.

The quick buildup of variable-sweep research in industry has been spurred by requirements for four types of aircraft now under consideration by various governments. Variable-sweep wings will probably get their first practical test on one of these aircraft. Possibly all will end up using variable sweep. The four airplanes are:

- **Long-range tactical fighter.** USAF requirements for this aircraft—the TFX—include takeoff and landing from fields shorter than 3,000 feet, supersonic flight at sea level for considerable distances, and transoceanic ferry ranges without refueling. Many experts say that these requirements can't be met without variable sweep.
- **Small close-support aircraft.** Rough field STOL operation near the front line is a prime requisite for this airplane, along with low fuel consumption and high loiter time near sea level. These capabilities call for long straight wings. But high subsonic dash speeds are also needed to carry this aircraft through defended areas, and this means sweeping the wings. An airplane of this type, known as the VAX, is under study in the Pentagon for close support of the US Army and the Marine Corps. The NATO nations are considering the joint development of a close-support airplane. The requirements might be combined and a single airplane produced for universal use in NATO.
- **Long-range surveillance aircraft.** The Army is planning a successor aircraft to the Grumman AO-1, now used for battlefield surveillance. Many consider variable-sweep wings to be the ideal answer to the Army's surveillance aircraft requirements, which are not materially different from those for the close-support airplanes just mentioned.
- **Supersonic transport.** European and US manufacturers are hard at work on the problem of designing a supersonic transport which will appeal to the world's airlines. Regardless of its flight speed (Mach 2 or Mach 3), there is growing evidence that it will use variable-sweep wings. All supersonic transports will need long-span wings so that the airplane can climb well and pass through Mach 1 above 45,000 feet to avoid shock-wave damage on the ground. Another absolute requirement is the capability of completing a transoceanic flight at subsonic speeds if engine trouble forces the airplane to slow down. Few aerodynamicists see a way of providing the necessary aerodynamic efficiency at subsonic speeds without using variable-sweep wings.

Along with these more or less firm requirements the new variable-sweep-wing technology is deeply influencing the planning for other types of high-performance aircraft which are not now so close to the construction stage. One of these is the long-range supersonic interceptor of the F-108 class. Variable sweep on such an aircraft could improve its performance in every phase of an interception mission—takeoff, cruise out, loiter in the interception area, combat, and cruise home. The Mach 3 intercontinental bomber also would benefit from variable sweep, though probably not as much as a long-range interceptor because its mission normally does not call for loiter.

There is little doubt that variable sweep will be employed on lifting reentry vehicles from orbital flight. These machines suffer from the most complicated case of high-speed/low-speed conflict. A satellite speeds of 18,000 mph it is impractical to give these aircraft much of a wing span. But they will land just like any airplane, and they will need a long wing span if the landing speed is going to be kept within reason. Most reentry gliders will be lightly loaded compared with conventional airplanes, and variable-sweep wings could bring their landing speed down well below that of current jet transports. An added benefit would be a greatly increased gliding range. Most reentry gliders will have a very low aerodynamic efficiency with a lift/drag ratio of two or less. Variable-sweep wings could increase this efficiency several times and give the pilot a wide margin for error for a conventional landing on a runway.

The new variable-sweep knowledge undoubtedly is causing a reappraisal of the design for the aerospace plane—the one-stage vehicle intended to fly itself into orbit without the aid of rocket boosters. Variable-sweep wings could help a lot during the early part of this long climb and acceleration to orbital altitude and speed. With wings outstretched, the vehicle could climb efficiently to 40,000-60,000 feet while accelerating to Mach 1. Then, by gradually sweeping back the wings, the aircraft could pass through the supersonic speed range with good aerodynamic efficiency. With the wings fully retracted the airframe would become a good hypersonic configuration at high altitude.

The resurgence of professional interest in variable sweep beginning in 1959 was hampered somewhat by misunderstandings that sometimes took months to resolve. Similar questions and apprehensions will undoubtedly arise among pilots and other operational personnel as the variable-sweep wing enters development and nears service.

The first point that the experts make about today's approach to variable-sweep design is that it is fundamentally different from that used on the X-5 and the XF10F. On these aircraft the wing root had to be moved forward as the tip was swept back. Otherwise the wing's center of lift moved too far back of the airplane's center of gravity and the aircraft would become too stable. Excessive stability would make it impossible to maneuver and control the airplane with a normal-size horizontal tail. Early variable-sweep wings were unacceptably heavy due to the complicated mechanism needed to move the wing forward and aft while changing its sweep angle. The weight and complexity was simply not worth the wing's aerodynamic benefits.

The technical advance realized in 1959 was to eliminate the need to move the wing root fore and aft and thereby prevent the airplane from becoming too stable while its wing was swept back.

(Continued on following page)

Basically this was achieved by moving the wing pivot point outboard and by using a fairly large wing stub next to the fuselage. Most of the lifting area on the stub is kept ahead of the pivot, and the leading edge of the stub has a fairly low-sweep angle. Thus the major part of the lift is developed by the stub as the wing is swept back to high angles. This technique keeps the wing center of lift at virtually the same point relative to the center of gravity so that the airplane experiences a very small trim change as the wing is swept back from zero to ninety degrees.

To sum up, the performance benefits of the variable-sweep wing can be traced to three factors:

- The wing, when fully extended, has a long narrow span with a moderately thick airfoil—the ideal configuration for subsonic flight. It permits low landing speeds, use of short fields, low fuel consumption, high loiter time, and long ferry range.
- At supersonic speed, when the wing is swept back sharply, the thick wing becomes a thin wing as far as the airflow is concerned. This happy situation occurs because the air flow travels a much greater distance over the surface of the swept wing than it does over the straight wing. This effectively thins out the wing.
- Reduced gust loading in turbulent air, a major factor for all supersonic airplanes, especially those intended to fly above Mach 1 at sea level. Turbulence causes sudden changes in wing angle of attack. Therefore, the best wings in turbulence are least efficient from a lift point of view. They produce the smallest change of lift for each degree of change in angle of attack. No wings at all, in fact, would be best in high turbulence. In many instances turbulence imposes the maximum loads that an airplane must withstand. The physical beating from severe turbulence is a major cause of both airframe and pilot fatigue. Some manufacturers even expect that airframe fatigue life will be greatly extended by variable-sweep wings, as explained earlier.

From the safety point of view, there are two main questions concerning variable sweep:

- Could the sweep mechanism fail and allow one wing to move independently of the other and make the aircraft uncontrollable? Mechanical studies to date have considered fail-safe designs in which no single component failure would allow relative motion between the wings. The designs also provide for dual power sources so that the failure of one would not prevent the controlled operation of the system. It takes only a small amount of power to move the wings, and as simple a mechanism as a hand crank arrangement could be installed to allow the pilot to supply adequate emergency power manually.
- If the wings became locked in the extreme rearward position, could the aircraft be landed safely? Experts insist this situation is unlikely—almost impossible. Even so, studies show that, if this happened, the landing speed would be below 200 mph for most configurations being considered. The normal-sized horizontal tail could give adequate pitch-and-roll control down to speeds of less than 200 mph so that a belly landing could be made. Roll control normally is provided by differential movement of the horizontal tail when the wing is full back.

One big question remains now after it has become clear that variable-sweep wings have opened wide new military and economic opportunities in aviation. Which nation will be the first to take advantage of the new opportunities?

The NATO nations of Europe which receive strong technical support from US research agencies have moved ahead on variable sweep as rapidly as the United States. Virtually all British aircraft companies have done enough work on the new wing to use it as a basis for detailed NATO fighter designs.

The German industry, especially the combine of Messerschmidt, Heinkel, and Siebel, have approached variable sweep as the wing of the future. Their research in this field is reported to be exceedingly thorough and original. This combine is well into the hardware design phase.

Fokker is another very active European company, and it is closely associated with Republic in the United States.

In the United States the effort to start development of a variable-sweep fighter for TAC began early in 1960. The effort bogged down in the last days of the Eisenhower government, but it was revived early this year as the administrations changed. Secretary of Defense McNamara and his aides made a determined effort for about three months to get the services to agree that one variable-sweep airplane could adequately perform all of their close-support, long-range interdiction, reconnaissance, and air-superiority missions. Mr. McNamara's views on the subject are contained in a paragraph from his congressional testimony:

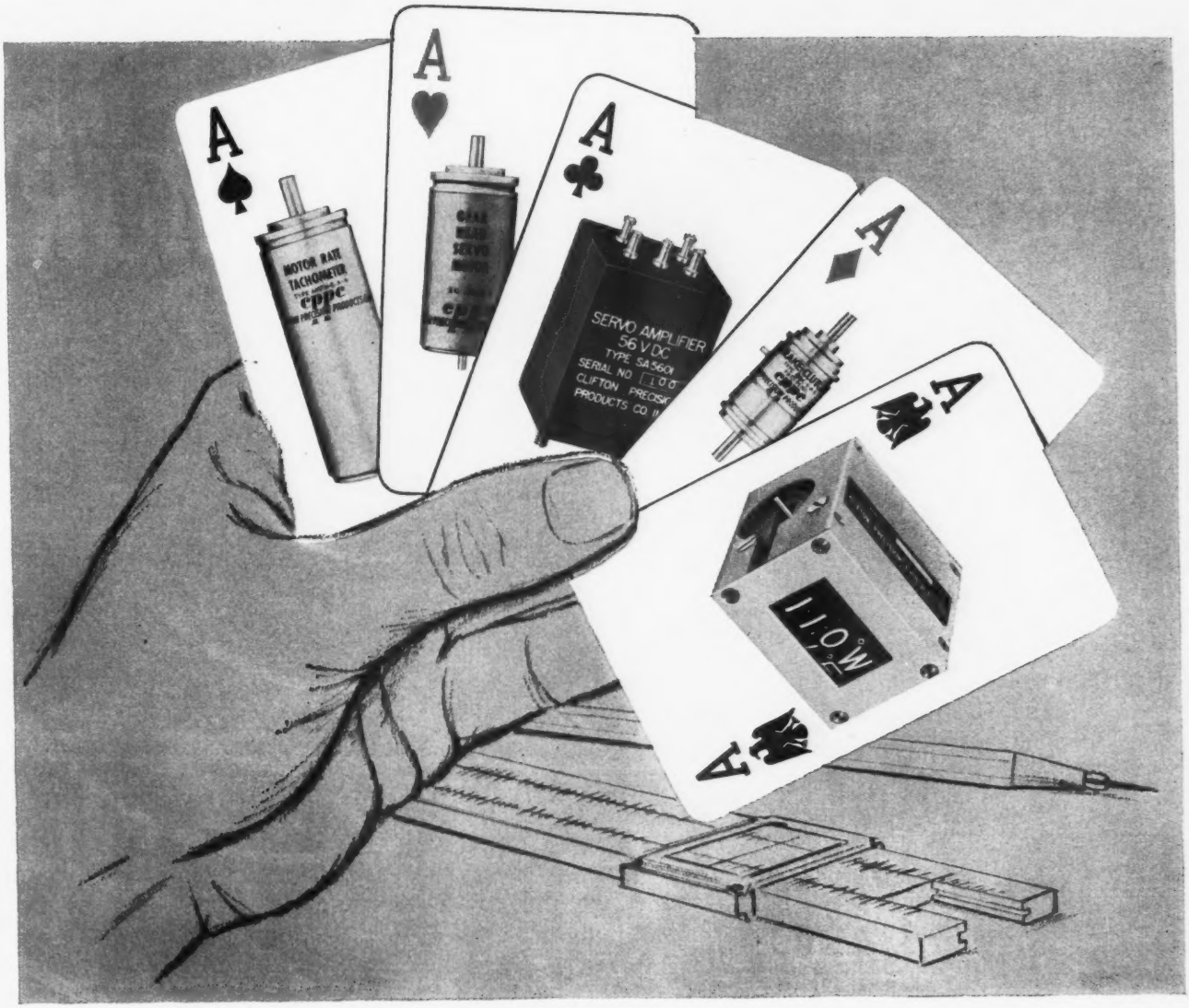
"New developments in engine performance and in aerodynamics, particularly the variable-geometry-wing concept evolved by NASA, now make it possible to develop a tactical fighter which can operate from aircraft carriers as well as from much shorter and cruder runways and yet can carry the heavy conventional ordnance loads needed in limited war."

It proved impossible to get triservice agreement on this one aircraft. The management focus then shifted to the possibility of an agreement on two new attack airplanes, which between them could handle all of the necessary missions. This effort was successful, and approval has been given for the TFX and VAX airplanes.

Development of the TFX should begin early in 1962, two and a half years after the new variable-sweep concept was first discussed by NASA, the industry, and the military. Under normal development procedures this airplane would fly in late 1965 or early 1966. Many US experts believe there has been enough time for the Soviets to have generated a strong development program which could have variable-sweep-wing airplanes in the air in another couple of years.

There is no positive evidence of such a program, but then there probably wouldn't be until the Russians held another of the Moscow air shows to let the West in on what they already have accomplished.—END

5 ACES !!!



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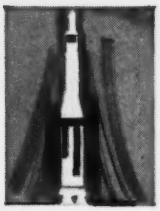

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'NONPROFITS': Prime Movers in the Space Age

By Claude Witze
SENIOR EDITOR, AIR FORCE MAGAZINE

This is the first of a two-part series examining the role of the nonprofit corporation in an aerospace-defense context.

IN 1830, when a musket still was a handy weapon capable of stopping a horse at a dozen yards, the Franklin Institute of Philadelphia was granted a research contract by the US government. The mission was to study the cause of boiler explosions, a project in applied research.

It is not recorded that the results were fully successful, but certainly they contributed to later weapon systems when steam boilers became part of the propulsive component of the battleship. What is more important as a precedent is the fact that the Franklin Institute was a nonprofit organization.

In 1830, the technology involved in development of the steam engine was new, complex, and crude. The application of steam power to rail and water transportation was being pushed to the limit of the state of the art. The government had an interest in the subject, but there was neither talent on the federal payroll nor federal facilities for researching the strength of materials under high temperature and pressure.

The Franklin Institute is still a nonprofit organization and today appears high on the Defense Department's list of contractors in that category, collecting more than $2 million a year for its services. From steam engines its laboratories have graduated to more profound areas, such as a current USAF study for the Office of Scientific Research entitled: "Properties of Medium Weight Nuclei."

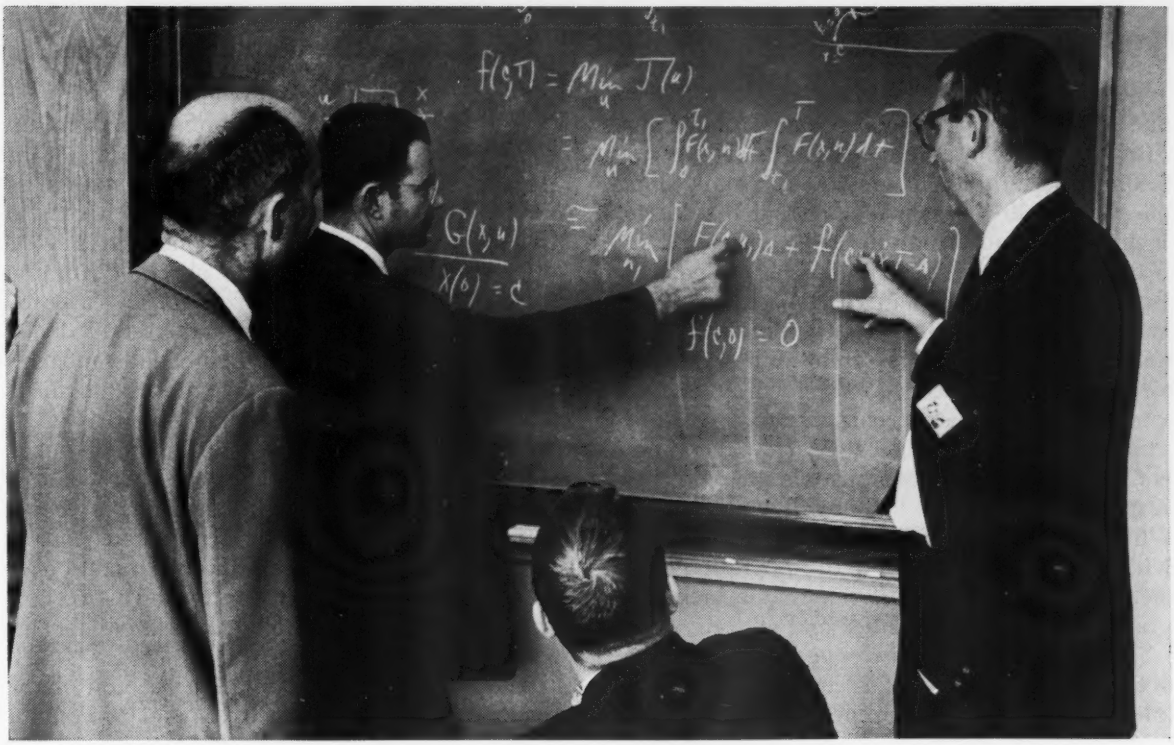
One of the earliest applications of a contract with a nonprofit organization to a weapon system is recorded in connection with the first military step toward airpower. It was the War Department grant to Samuel P. Langley and the Smithsonian Institution for development work on a flying machine. The date was 1898, and the result came to disaster in the Potomac River nine days before the Wright brothers staggered into the air at Kitty Hawk in 1903. It is interesting, but not germane, to point out that nonprofit organizations were in the airpower picture before private enterprise. The first Wright brothers military aircraft, built on contract was delivered in 1909.

What has happened to aerospace systems since the start of military aviation is an often-told story. The growth of technology in the years since World War II alone is the most staggering part of this saga and the progress of the last ten years the most astounding of all. The demand has resulted in the organization of more than 350 nonprofit organizations in the postwar years, most of them concerned with some aspect of the missile, electronic, and atomic technologies. The Air Force is not the only customer, but it is a substantial one. The Atomic Energy Commission and other government departments use them in addition to the military services. In early September, the Research Analysis Corporation, located just outside Washington, was organized on a nonprofit basis to help bolster, the announcement said, "the strategic, tactical, and management capabilities of the US Army through scientific research and analysis." It already has 450 persons on the staff.

More recently it was announced that the Defense Department is sponsoring the creation of a new "Logistic Management Institute." It will be a nonprofit organization with a full-time staff of highly trained business management specialists. The mission will be to seek breakthroughs in logistics management.

And industry itself shows signs of leaning toward the nonprofit unit in areas where public service is paramount and there is evident determination to keep it so. The communications industry is about to propose a nonprofit organization to own and operate a communications satellite system. Government participation is considered possible and likely, but the initiative appears to have come from industry itself, which is willing to finance the project and share in its utilization.

The Air Force is commonly known as a prime cus-



The requirement: Objectivity, competence, imaginative thinking. The mission: To insure national survival.

tomer and creator of nonprofit organizations. One of the first and best-known examples is the RAND Corporation, described by *Harper's* as an "arsenal for ideas" that "is in the business of finding ways to apply scientific skills to the problems of national security." Its defense contracts run in the neighborhood of $15 million a year. Another is MITRE Corporation, substantially larger than RAND, which has broad systems engineering and technical direction responsibilities in the development of USAF command and control systems. A third major USAF nonprofit contractor is Systems Development Corporation, which was listed in 1960 as second only to MIT as a nonprofit contractor, with a total of $35 million in Defense Department business. Others range from the Cornell Aeronautical Laboratories to the Institute for Defense Analysis, which has offices in the Pentagon, and a list of research institutes, most of them affiliated with universities.

In fiscal 1960, the latest year for which complete figures are available, the Defense Department had contracts with nonprofit organizations totaling $370 million. Of this, thirty-five percent was paid to academic institutions, colleges, and universities. About twenty-seven percent represents contracts with research centers associated with academic campuses, such as MIT's Lincoln Laboratories and the Stanford Research Institute. A quarter of the total, twenty-five percent, was paid to nonacademic organizations with the capability to make hardware but only six percent to nonacademic groups without this capability. Finally, seven percent of the total was in the form of contracts with nonacademic corporations primarily concerned with technical review and guidance operations.

This seven percent, a proportion that is increasing rapidly on the threshold of the space age, may represent the most critical part of America's effort to meet the technological challenge dropped on our doorstep by Soviet Russia. Asked to name the priceless ingredient of the complex systems that will operate in space, for military or peaceful missions, the men in charge will agree it is the engineering architecture and management of these systems. The task of providing this architecture and management is one that cannot be entrusted to less than the most competent and objective experts.

In the jargon of the scientist and engineer, this architecture and management is called "systems engineering" and "technical management."

Systems engineering is described as the integration of a number of complex subsystems, each of them usually involving a different branch of technology. Just as an architect has to have familiarity with plumbing, types and materials for construction, heating systems, landscaping, building codes, and insulation, the modern aerospace system demands an even wider and more integrated talent. No single "architect" can possibly have complete competence in all of the technological areas, particularly when the job is complicated by design compromises. Engines must be bigger because payloads cannot be smaller or payloads must be smaller because engines can't be bigger. The components must fit together and work together. They must be ready when they are needed on the assembly line. The systems engineer must have some degree of competence in all fields to ensure that the right compromises are made and that maximum results are ensured.

Technical management is the activity that demands the ultimate in objectivity. It is the job of getting the word to the subsystem contractors, both on the standards of performance required and—even more critical in many instances—on the modifications that are accepted. These may result from some of the compromises mentioned above, from unexpected problems in design and construction or from advances in the state of the art. An adjustment in one subsystem may com-

(Continued on following page)

plicate one contractor's job and ease the problem for another. Requirements must be changed all along the line to accommodate these changes. At the same time, the technical manager must make sure that the whole pattern is proceeding according to the established concept and objectives. All decisions must be impartial.

Both Congress and the Executive Department, urging all possible speed and effort for the now-acknowledged space race, still have the system under constant critical scrutiny. A few weeks ago President Kennedy, taking note of a rising crest of congressional interest, ordered the Bureau of the Budget to "review the effectiveness of this means of accomplishing the government's purposes."

The White House pointed out that the trend is toward wider use of contracts "for the operation and management of research and development facilities and programs, for analytical studies and advisory systems. . . ." The President acknowledged that the contracts have made it possible to "accomplish scientific and technical work essential to urgent public purposes."

While Mr. Kennedy did not single out nonprofit organizations for particular attention it was clear from the atmosphere on Capitol Hill that most of his interest centers on this type of operation.

There is a strange contradiction in the fact that the perpetual monitors of the defense effort in Congress have widely divergent views on the subject. Aerospace Corporation, newest nonprofit creation of the Air Force, was formed with the blessing and at the instigation of the Military Operations Subcommittee of the House Committee on Government Operations. Yet its operation is under examination by the Subcommittee on Manpower Utilization of the Committee on Post Office and Civil Service. Both the Armed Services Committee and the Committee on Science and Astronautics have displayed interest. And the Defense Subcommittee of the Committee on Appropriations has threatened to demand "severe restrictions" on the utilization of nonprofit organizations. Specifically for Aerospace, it recommended a slash in its budget for fiscal 1962 from $35.2 million to $30.2 million.

The Appropriations Committee report viewed with alarm the growing practice of contracting for technical management, scientific evaluations, and administrative and management services. It said USAF uses these services to a greater extent than other branches of the government, particularly from nonprofit organizations. Then it stated, clearly, the issue that has aroused congressional interest:

"The employees of such (nonprofit) organizations are paid indirectly by the taxpayers to the same extent as employees under civil service are paid directly by taxpayers. The pertinent major difference is that their pay is higher. . . . To a considerable extent the use of contracts with nonprofit organizations is merely a subterfuge to avoid the restrictions of civil service salary scales. . . .

". . . It is noted that the buildup of these organizations has not been accomplished by corresponding reductions in the number of military and civilian personnel on the government payrolls. . . ."

This is the aspect of nonprofit operations that stirs most interest on Capitol Hill, where both the taxpayer's dollar and the welfare of the federal employee get a full share of attention. But it is not the only one that contributes to the atmosphere as new nonprofit organizations are formed to accept government contracts. Their increased utilization, says a writer in the *Harvard Business Review*, "reflects a conclusion by government officials that they cannot entrust projects vital to the national defense (such as missile program management) to profit-making enterprises."

There may be truth in this statement but the *Harvard Business Review* failed to show that it is the honest hunt for objectivity that favors the nonprofit corporation. This can be documented from the 1959 and 1960 hearings of the Military Operations Subcommittee of the House Committee on Government Operations. Nor did the *Review* examine the impact of technology on management.

The transcripts are a running account of the USAF struggle to achieve objectivity and to convince both industry and Congress that this was a fact. If we take the ballistic missile area, one in which urgency existed just as it does today for the space programs, the first USAF reaction was to get speed—this was in 1954—and give the responsibility for architecture and technical management to a private contractor.

At the outset, the contractor was a firm set up by Drs. Simon Ramo and Dean Wooldridge. It was selected after a committee of experts, called the Strategic Missiles Evaluation Committee and headed by Dr. John von Neumann, had decided that the conventional prime and subcontractor pattern would not be able to meet the demand for fast action. The Air Force then commissioned Ramo-Wooldridge to set the basic system concepts and specifications, and coordinate and direct the work of its industrial associate contractors. This was the method used on both the Thor IRBM and Atlas ICBM missiles. Both systems exceeded their performance specifications and were operational in record time.

One congressional committee said:

"From the performance standpoint, Ramo-Wooldridge (STL) along with BMD, can point to the fact that they 'beat the clock' and surprised many experts in getting operable Atlases and Thors from factory to field in so short a period of time. There will be many—in industry among participating contractors, in government among rival services—who discount the contribution of Ramo-Wooldridge (and STL) but this organization can take pride in its own right for what it has done for the United States."

But there was a rub. The largest single stockholder of Ramo-Wooldridge was Thompson Products, Inc. This company is in business to make money. It found that its investment in Ramo-Wooldridge cast doubts on the objectivity of Ramo-Wooldridge decisions. The House committee, in its 1961 report, made the situation clear. It pointed out that USAF had placed a "hardware ban" on Ramo-Wooldridge, making it ineligible for development and production contracts. Then:

"Thompson Products looked to Ramo-Wooldridge as its vehicle for entry into new fields of production. And Ramo-Wooldridge itself had ambitious plans. Although it received sizable and certainly ample fees . . . the company's top executives were keenly alive to the fact that the real money-making potential was in hardware production. . . .

"Industry too," the report says, "was becoming restive." The Ramo-Wooldridge division associated with the USAF Ballistic Missile Division was called Space Technology Laboratories and the contractors working under its direction "did not relish (STL's) access to their technical data. . . . Nor were the contractors impressed by the temporary hardware ban imposed on Ramo-Wooldridge. They looked forward apprehensively to the day when, heavily armed with technical knowledge and equipment, Ramo-Wooldridge would offer formidable competition in the industrial area."

In late 1958 STL became a separate corporation and the rest of Ramo-Wooldridge was merged with Thompson Products to become Thompson Ramo Wooldridge Inc. STL, however, remained a wholly-owned subsidiary of the new corporation and, as Dr. Ramo told the House committee in 1959, had to have a "reasonable return" on the investment. He argued that STL differed from other profit-making corporations in that it stopped at systems engineering, technical direction, and laboratory work. It did not have a production factory.

The House committee was not impressed. It acknowledged that STL was doing an important job, one that USAF could not perform itself because of the impossibility of mobilizing the technical talent in a military organization. But it reiterated that complete objectivity was essential and charged USAF with responsibility to ensure that objectivity. It said STL "is frank about its interest in expanding operations."

"In acquiring the services of STL," the 1959 report continued, "the Air Force was not seeking low-echelon technical competence, for salaries at this level admittedly are no higher than salaries paid for comparable work in the government. What the Air Force got was the combination of scientific talent and business-managerial ability possessed by the small group of company executives. In view of this fact it is not surprising that the top executives have an interest in building up the company and increasing its profit."

The report said STL was complaining about a low rate of profit and said that the statistics substantiated the complaint.

The solution? The committee said that if STL were to have any future with USAF "it must be converted to a nonprofit institution. . . . The aggressive profit-making drive, better suited to a production company, would be replaced by a quieter sense of dedication to scientific pursuits and government service."

USAF's answer was the creation of Aerospace Corporation and the concept itself clearly was recommended by the House report. The Secretary of the Air Force asked a committee headed by Dr. Clark B. Millikan of CalTech, to review the management of the Air Force ballistic missile and space systems programs. This group favored formation of a new noncompetitive organization to replace STL.

Max Golden, general counsel for the Department of the Air Force, has emphasized that Aerospace Corporation has deep roots in the history of Air Force weapon system development. He views the traditional prime contractor, the independent systems contractor, and the nonprofit corporation as "progressive attempts to keep forms of management abreast with technology."

"Each of them," he says, "was created within the framework of private industry to perform a common function. The first step was to concentrate this function in a single manufacturer, the second to sever it from hardware production, the third to sever it from the profit motive."

Mr. Golden also has addressed himself to the charge, repeated in many congressional hearings, that the Air Force is abandoning its management responsibilities to the nonprofit organizations. He replies that USAF still "remains firmly in the driver's seat . . . it does not follow that Air Force supervision stops if a matter falls within Aerospace's province."

He argues:

"Aerospace does not detract from Air Force program control. It enhances it. Think back for a moment to the single prime contractor approach. In contrast, Aerospace provides the Air Force with an impartial and disinterested check on the work of other contractors. With Aerospace, moreover, the Air Force is able to contract directly with these contractors."

On the subject of salaries paid by nonprofit corporations, and again the spotlight has been fixed on Aerospace Corporation, there is a consistent effort by congressional critics to compare them with civil service standards. There has been no emphasis on the fact that the government pays lower salaries than private industry. And the nonprofit corporation, in the market for top talent, competes with industry, not the government, for that talent. Hence, salaries are comparable with those paid in industry. Unless, as Mr. Golden has pointed out, all private contractors are required to conform to government pay scales, it will be difficult to single out nonprofit organizations as the ones which must conform.

In view of the sometimes stormy past that has led to increasing utilization of the nonprofit corporation, outlined in this article, it may be time for a new look at the trend. It is a look that should be shared by Congress, industry, all government departments, and the executive. The Budget Bureau study ordered by Mr. Kennedy, due at the White House in early December, is a first step.

Without conjecturing what the findings will be, it can be suggested that there be another examination that considers both the urgency of the national effort and the alternatives if the nonprofit device were not available.

Both Congress and profit-making industry can afford to do this and have an obligation to do so. It is possible that the observation of the *Harvard Business Review* is wrong. It is possible that nonprofit organizations, providing top talent for engineering architectural services, with the only true objectivity that can be obtained, will protect the role of American industry in the space age. Next month AIR FORCE Magazine will examine these possibilities.—END

At AFA Convention in Philadelphia, Air Force Secretary Zuckert, right, congratulates Lyle S. Garlock, assistant secretary for financial management, on winning AFA's Arnold Trophy as "Airpower's Man of the Year." Between them is Joseph Foss, AFA's new national president, and at left is Mrs. Garlock. Secretary Zuckert's remarks at the Awards Banquet appear below.

Geographical and technological battlefields cover the world and characterize our times. The Communist challenge is an immensely broad one. Our flexible Air Force, prepared today and preparing for tomorrow, must be ready to meet every facet of this challenge . . .

The US Air Force—Today and Tomorrow

By Eugene M. Zuckert
SECRETARY OF THE AIR FORCE

IF ANYONE had told me fifteen years ago that tonight I would be giving this state of the Air Force message as its Secretary at this meeting, I would have dismissed the prediction as incredible. I cannot truly express my appreciation of the privilege of standing here in this role tonight.

The Air Force has expanded rapidly because it had men of vision and capacity at its head when it first became a dominant force for shaping world peace. The strange and fortunate thing was that the stature and ability of those who guided its explosive progress in critical days—Bob Lovett, Hap Arnold, Stuart Symington, and Tooey Spaatz—characterized at its best the complementary civilian and military leadership called for by the ideal working of our system of government. Believe me, Curt LeMay and I work every day of our lives to seek to maintain our partnership in that same tradition.

Besides my personal gratification at being here as the civilian head of our great Air Force, it is a source of deep satisfaction to participate in the Air Force Association's Awards Banquet.

Your Association, through its firm devotion to the cause of airpower, has materially increased the chances of our success in the desperate struggle for peace. You have accelerated national consciousness of the essentiality of airpower, whether airplanes, missiles, or

(Continued on page 61)

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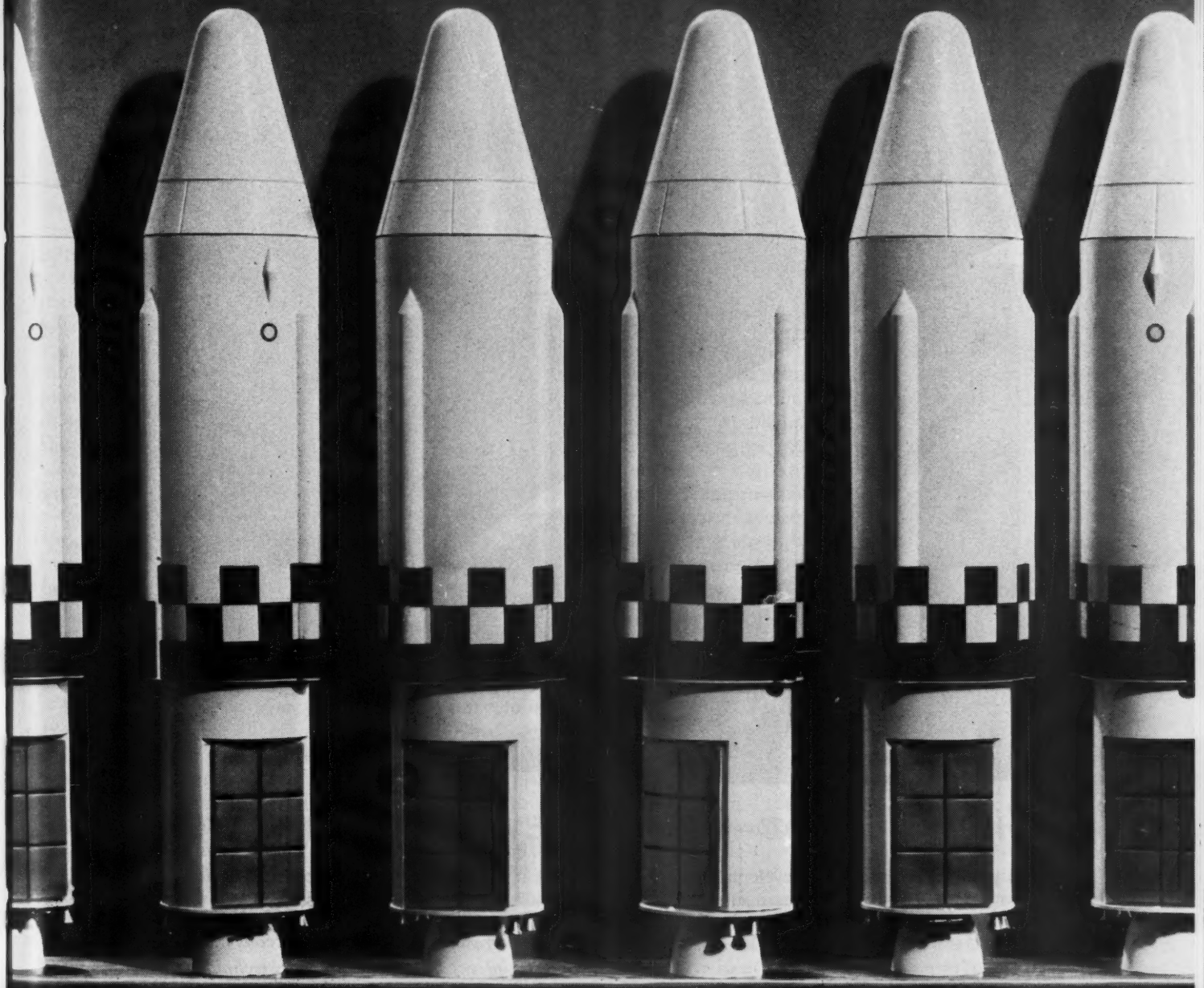

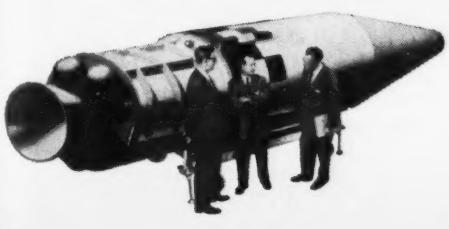

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vehicles for the barely penetrated frontier of space. Tonight you have here some of the heroes of that restless, productive effort.

We are gathered to honor not only prophets, but doers. We have seen their good works. They can take deep satisfaction from the tributes of those who are shoulder-close. There is no greater reward than tribute by one's own. Each of your honorees tonight is a prophet honored in his own country, among and by his own associates and coworkers.

I am sure I shall be forgiven if I add my own word concerning your top "Man of the Year." Lyle Garlock has been our Assistant Secretary since 1953. He came to the Air Force with military budget experience where it counts. He became the single most effective force in giving vital civilian leadership and assistance toward maintaining the current effectiveness and future capability of the Air Force.

He combines vision and toughness with a completely realistic sense of the workings of democracy and our government. His motivation has always been simple; the best interests of our country. He never confused *that* with tactical objectives. He has always been the most delightful, enlightened, and effective proponent of self-criticism by the Air Force in its advocacy—and this is one of the most important functions of those who exercise civilian control. Our country can truly be grateful to Lyle Garlock, a statesman of airpower.

In addressing ourselves to the state of the Air Force, we are unalterably forced to look upon its role today in a grim struggle. The obvious place to turn is Berlin, but this is merely emblematic of a much wider battle. We will know when the Berlin drama has been played through whether the Soviets can be persuaded to see the wisdom of adherence to solemn contract and the peaceful settling of differences.

President Kennedy, keenly aware of the need to increase our deterrent effectiveness against the full spectrum of the Communist threat to peace, has directed that the Air Force, the Army, the Navy, and the Marine Corps strengthen the entire range of their military operations capability.

While maintaining intact—and trying continuously to improve—the imperative nuclear backing provided by our powerful right arm, the Strategic Air Command, we have the job of beefing up other elements of airpower.

We are trying to provide—and swiftly—a far greater measure of flexibility than called for by our previous plans.

It has been clear to the world in recent months that the United States is going to great lengths to demonstrate again its restraint, wisdom, and maturity in the interest of world peace. One evidence of that determination has been to increase our strength and ability to resist pointed threats to the peace, without reducing the backbone of our strategic nuclear posture.

This step has certainly demonstrated to the world that we are prepared to meet the growing threat in Berlin in any way it may develop. To attain the required flexibility swiftly has placed new demands on the Air Force.

There are two principal elements of the flexibility which the Air Force is seeking to provide. Both of these are part of the function of support for the Army. In order for the ground troops to be able to fight anywhere in the world, they need an airlift capability much in excess of that for which we had planned. In the last few months we have taken firm steps in the direction of meeting the need. We have bought new transports; we have strengthened our arrangements for utilizing the capability of the civil air fleet; we have taken the first steps to bring into being the newest and most modern military transport. These are but the beginning, because we intend to continue our emphasis upon this kind of support.

The Army also relies upon the Air Force for the necessary close air support to assist the ground troops. For some years, in accordance with the philosophy of our defense planning, the emphasis upon tactical air had diminished. This trend has been reversed—we are determined to find better and more imaginative ways of providing tactical air support. We will devote resources to strengthening tactical air in being.

This job will require—and will receive—the closest working arrangement with the Army. The new unified command established by Secretary McNamara this week, leading to a new-type fighting unit made up of elements of the Army's STRAC and our TAC, will speed the improvements we seek. It will provide a new high-performance striking force, with a global mobility and fighting strength across the spectrum of warfare.

At the same time that we are concerning ourselves with the pressing problems of *today* and *tomorrow*—airlift, tactical air, and the indispensable elements of strategic nuclear striking power, missiles and aircraft—we are devoting ourselves to an area in which the military requirements are just beginning to appear. I refer, of course, to space.

America must push forward into the frontiers of space. Our trip to the moon is not merely a trip, but a means of pushing the exploration of outer space with all the potential that this has for mankind. We cannot allow any power to dominate outer space with the implications that such space superiority could lead to a deadly military disadvantage to this country.

These Air Force jobs of today, tomorrow, and the day after certainly present as difficult an array of management problems as any organization has ever faced. We are seeking to be self-critical and constructive in our analysis of how we might do the job better.

For example, we have been particularly concerned with the manner in which our weapon systems are acquired. The implications of modern technology are such that billions of dollars are involved in the full-scale development of any new weapon system. Although we believe that we have made great strides, we are not content with our own organization or our own techniques. The reorganization of the Air Force Systems Command last spring was an attempt to get at the heart of some of the problems within our own house. It is but a start.

(Continued on following page)

We are also looking to industry for improvement in its performance in fulfilling our demand for the incredibly complex devices that constitute the sinews of a modern war machine. American industry's enormous contribution to our defense posture, and the unprecedented depth of its knowledge and participation, make me confident that industry will respond constructively.

The seriousness of our problem is indicated by the fact that one petty mistake of procedure in testing a new missile can cost millions of dollars if the weapon blows up on the pad because of it. It is, of course, impossible to expect perfect performance in the environment of a racing technology. Nonetheless, we are convinced that better methods of contracting and the motivation induced by more imaginative contracting philosophy can be employed to obtain substantially improved results. We are taking steps to achieve these objectives.

Three areas are particularly deserving of attention—reliability, cost, and business responsibility.

Reliability, in simplest terms, means delivery *when promised* of a product that will work *as advertised.* Slippage on either count denies to the nation a part of its defense capability.

But we must have reliability and timely delivery at costs which don't threaten to price us out of the weapon systems business. In this day of sophisticated weaponry, the challenge is clear.

There must be a joint Air Force and industry response to this challenge. The same compulsions and initiative which produce profits from timely delivery of reliable products in commerce must be brought to bear on government work. The designation of defense business should not abrogate normal business responsibility. We must make sure that our business relationship is stimulative and productive of the best in American industry. We are far from that goal.

The things I have discussed tonight acquire an underlined importance because of the momentous events we are witnessing in the world today. Whether your thoughts turn to Berlin, Southeast Asia, or the nuclear test sites in Russia, you see a world of nuclear blackmail, violation of compacts among nations, inspired civil wars, subversion, and aggression. All of these are truly disheartening in a world that had good cause to think it had seen the end of war.

But these are facts, and if we are to survive—certainly to survive as a great power—we must devote our energies and abilities to dealing with the implications of these facts in a world where there is no longer any security in distance.

In such a world, our Air Force is a vital part of our defense establishment and should be a great reassurance. We in the Air Force will continue to strive to deserve the resources provided us—to sustain a worthy response to the determination of the American people to maintain aerospace power to defend freedom.—END

On US aerospace strength depends the survival of the free world. Essential to maintenance of this strength today is recognition within the Air Force itself that . . .

'Aerospace Power Is INDIVISIBLE'

By Gen. Curtis E. LeMay, USAF

CHIEF OF STAFF, UNITED STATES AIR FORCE

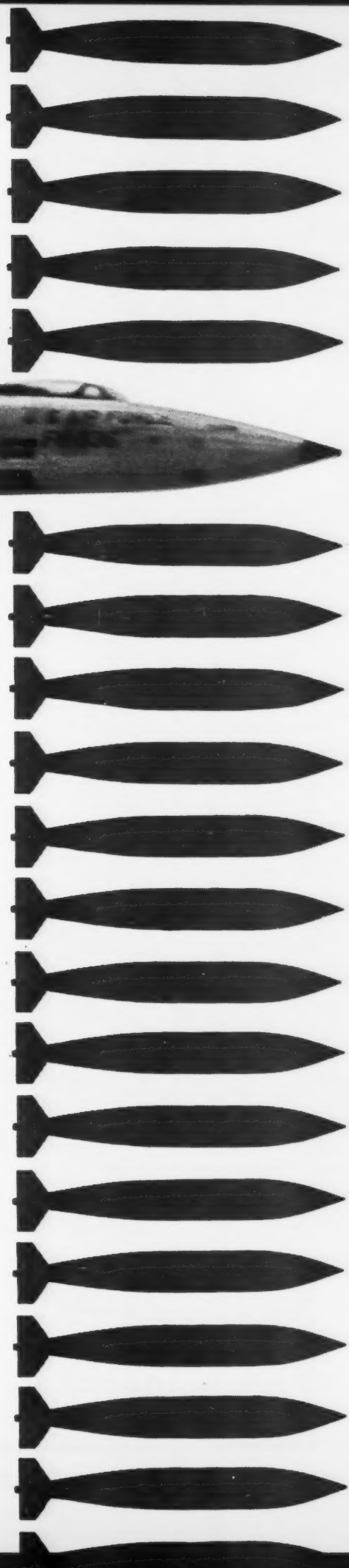
I AM VERY pleased to be here in Philadelphia for the Fifteenth Anniversary Convention and Aerospace Panorama. I know I am among friends, and that makes my participation a special pleasure.

Each of us here recognizes the seriousness of the world situation. And we know that in these times no one can be a passive participant in national defense. That is why we are here. That is why this Association was formed.

Each year the Association seems to do the impossible by having a larger and more interesting Panorama. As a result of your efforts, the thousands of people who visit the exhibits and attend the meetings will come away with an increased understanding of aerospace power and greater faith in American technology.

Many key topics will be discussed in the next few days. Out of the Convention seminars, briefings, panels, and speeches will come a report to the nation that I feel sure will be reassuring. It will constitute a

(Continued on page 67)

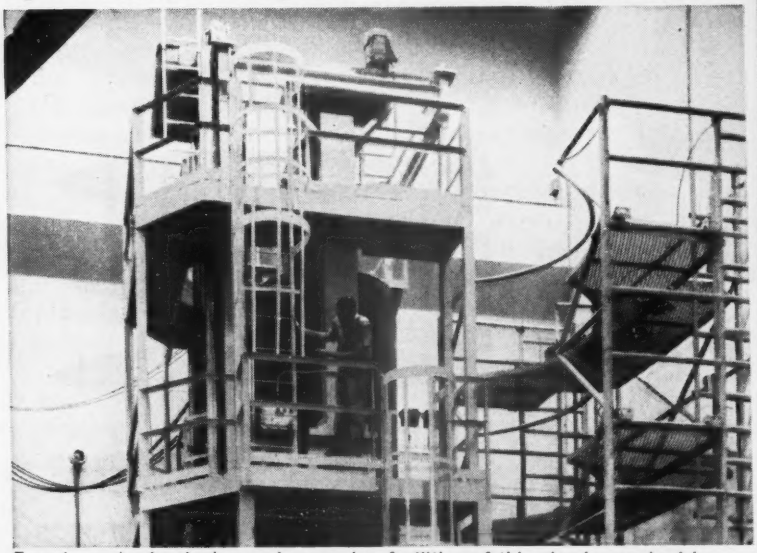


Scrappy infighter with a seven ton punch

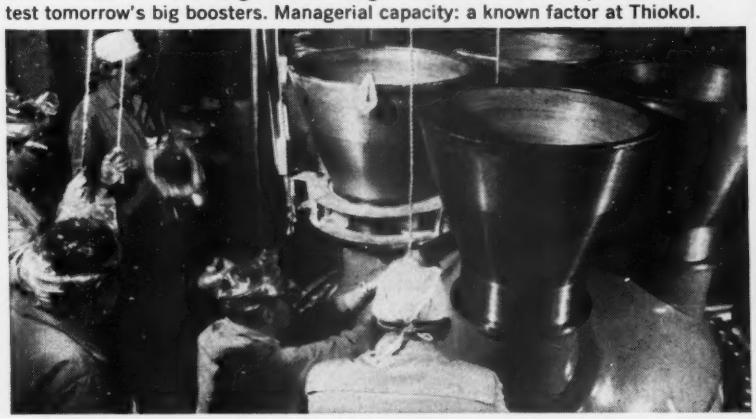
August 10, 1961: an F-105 crouched on the runway of Eglin Air Force base. Clutched to its belly and wings were twenty-six 565 pound bombs. Carrying more weight than a Flying Fortress, with no auxiliary assistance, the Thunderchief climbed for the overcast. When the simulated strike was completed, the F-105 had smashed every weight/size record in the logbook. Plus: it can carry 4000 different weapon combinations, including thermo-nuclear. Can qualify for 15 different missions. Can support Army ground troops at 250 mph, can hit the enemy at 1400. Will strike any target, any time, in any weather. Is now with the United States Air Force, here and over Europe.

REPUBLIC
AVIATION CORPORATION
FARMINGDALE, LONG ISLAND

Thiokol's Wasatch Division... now turning out the largest flight-tested solid rocket engine of record, Minuteman first stage... is capable of producing engines of satellite size. Plant growth: from 17 to 120 buildings since 1957.



Experience in developing and managing facilities of this size is required in order to create and manage the still larger facilities needed to produce and test tomorrow's big boosters. Managerial capacity: a known factor at Thiokol.

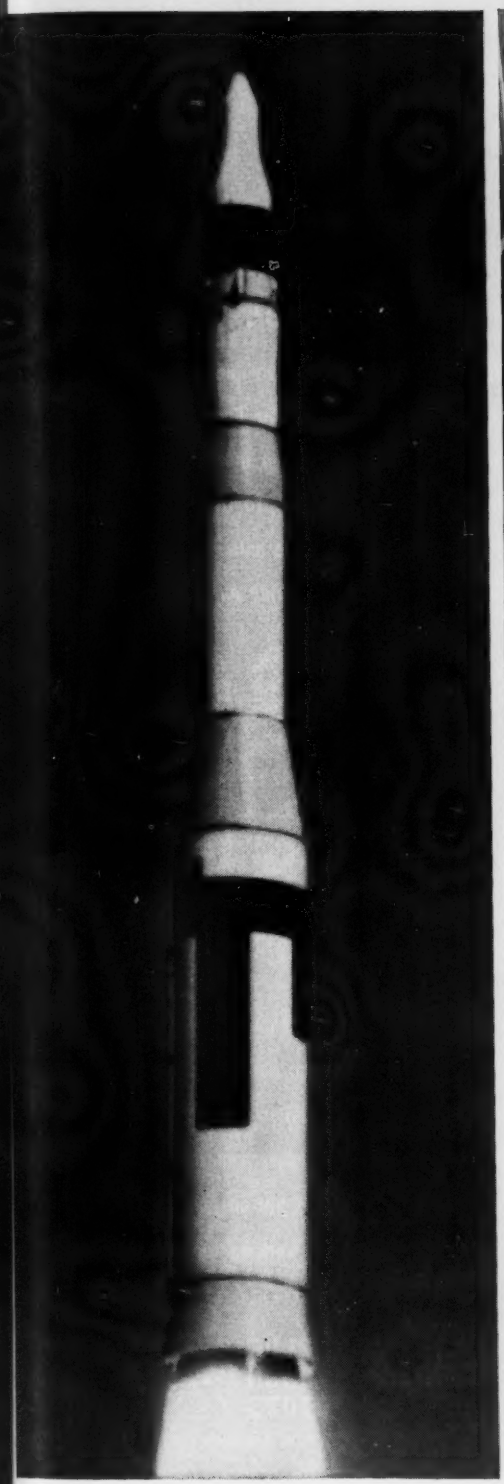


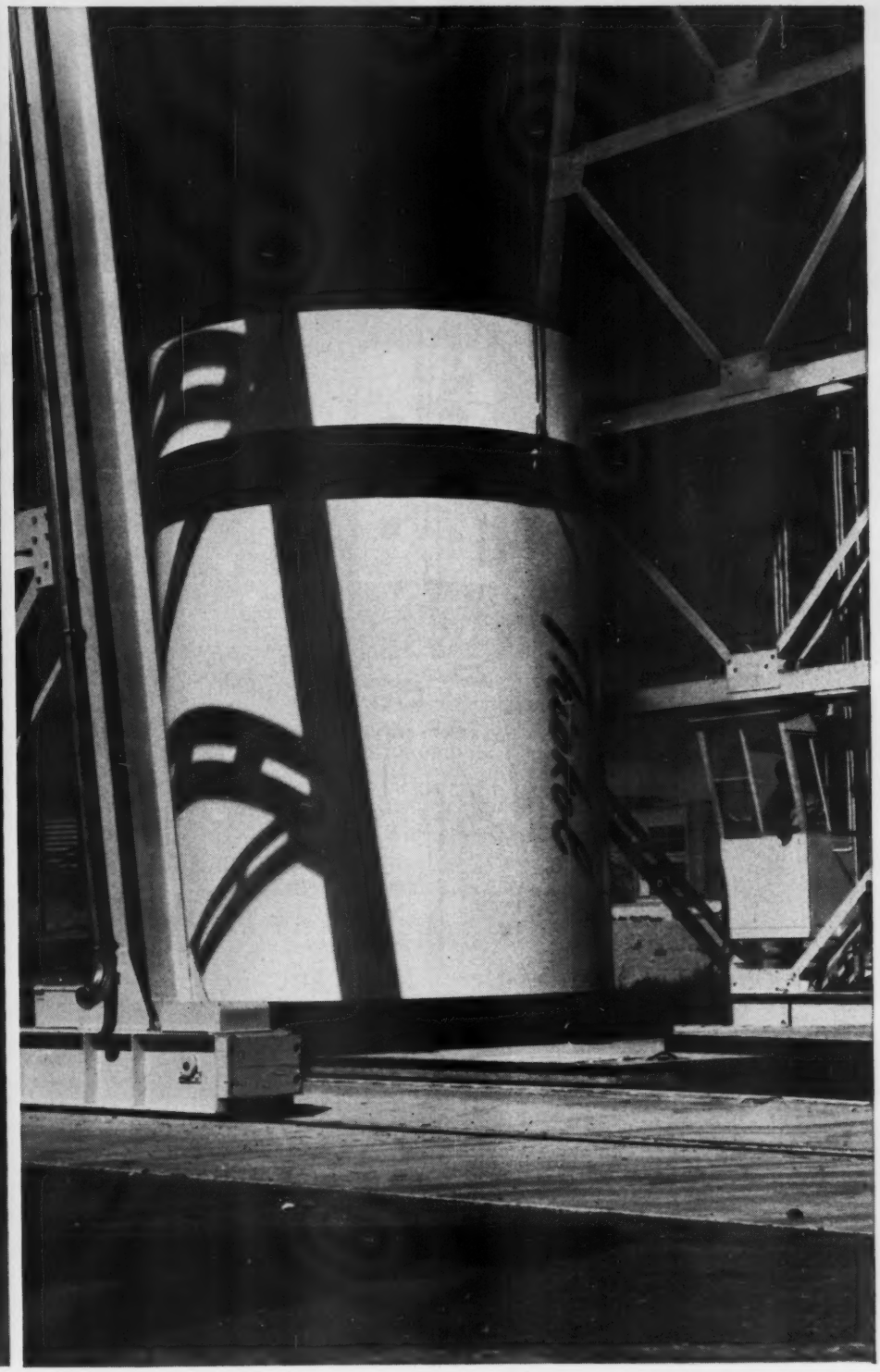
BENCHMARKS in the

SOLID STRIDES TOWARD SPACE BOOSTERS

As early as 1952, Thiokol recognized the need for the economy and reliability of giant solid rockets in our country's defense and space efforts. In 1956, the Corporation allotted and invested millions of its own funds in research and production facilities to meet these requirements and assigned its skilled management, engineering and technical teams to man plants and lab-

THIOKOL CHEMICAL CORPORATION □ Bristol, Penna., Rocket Operations Center: Ogden, Utah





science of rocket propulsion

oratories. Having moved with rocketry through early frontiers, Thiokol is well prepared and well equipped to meet the challenge of the new frontier. □ Thiokol has designed, developed, and produced the most powerful and also the largest flight-tested solid rocket motors on record... Zeus, with 450,000 pounds thrust, and the first stage engine for Minuteman.

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CHEMICAL CORPORATION

FIRST IN ROCKET PROPULSION

Engineers. Scientists. Creativity is always welcome. Perhaps there's a place for you on the Thiokol team. An equal opportunity employer.

TAMING THE WILD BLUE YONDER

Primary responsibility for research, development, production, testing and evaluation of the Air Force's newest weapons systems—this is the mission of the recently created Air Force Systems Command. To its men—our defense architects—this mission presents the eternal challenge . . . that of taming the wild blue yonder.

AFSC

In pursuit of this challenge AFSC must call upon the vast resources of industry and of education, as well as those of the military. AC Spark Plug is being called upon to develop and produce the small, yet highly accurate inertial guidance system for the TITAN II. This is but one example of American industry and government working together so peoples of the world may live together—in peace.

AC SPARK PLUG
THE ELECTRONICS DIVISION
OF GENERAL MOTORS

MILWAUKEE • LOS ANGELES • BOSTON

AChiever inertial guidance systems for Titan II, Thor and Mace. Bombing navigation systems for the B-52 and B-47.

firm warning to those who threaten the peace of the world.

Never before in our nation's history have we as a people been more patient and more determined to stand together to meet aggression. Because this is true I have not chosen to discuss hardware nor review the status of our over-all aerospace power. We are confident of our strength. The free world walks softly but firmly to meet any threat.

Our present strength and its effect on world events confirms more than ever the necessity for strong defense forces, not only today, but in the future. This is a continuing situation and a problem I intend to touch upon later this afternoon.

But there is another problem that I want to discuss now. It is a matter of high priority. It is a problem I feel the Air Force Association can work with us to solve. I say this because you are part of the Air Force family—a strong and vital part—and your assistance is both welcome and needed.

This problem is a matter of great concern to me—aerospace unity—because the strength of our aerospace power comes through unity of purpose and organization.

A very knowledgeable reporter stated recently that in the early 1950s he felt he knew what the Air Force stood for, but today he doesn't. His statement puzzled me. It also alarmed me because understanding our doctrine and concepts is basic and important to our existence.

Deterrence of aggression is composed of three basic elements—forces in being, public understanding of this force, and national determination to use the force if necessary. These are the three elements that make our force credible to our friends and to our enemies. If any of them is missing, credibility suffers proportionately.

Without understanding I don't think we can have the necessary degree of determination. And, of course, credibility is nil without these two elements. Now if this reporter, who has been close to aerospace power for many years, is not clear in his own mind as to just exactly where we stand today, it seems only reasonable that less informed people may be even more confused.

Is the public confused? If it is, how has it happened?

Admittedly, the Air Force has always had a variety of thinking within its own ranks. This is to be expected in a dynamic environment. We have been directly affected by revolutionary technology. New developments have brought changes in emphasis in our defense posture.

Other factors also enter the picture: changing national strategy and, of course, the budget. Within the Air Force we have had, in addition to differences of opinion between missile, fighter, and bomber people, the strategic, tactical, and air defense concepts. Then on the other hand there are the general-war and limited-war schools of thought and philosophical divisions on types of deterrence. You can add to this some additional confusion about our conventional-war role and capability.

Possibly this variety of views is why the sharply defined picture that we presented in the early 1950s has become fuzzy to some people.

Yet our basic concept has remained firm through the years. National security requires that we build, maintain, and modernize our aerospace power, and that we emphasize forces that can survive an attack and react with war-waging and war-winning capabilities. Today, for the first time in history, we can be directly attacked by strong aerospace forces. Therefore, the Air Force believes the greatest danger to our national survival is the direct threat against the United States itself. *By preparing for this threat* we believe that our strength also deters lesser conflicts for ourselves and for our allies.

But if there is some confusion today as to how we stand, we do indeed have a serious situation. If we do nothing more at this Convention than to clarify our position, I think it will be of great benefit to the public and to the Air Force.

I think we have been consistent in our concepts since the formation of the General Headquarters Air Force in 1935. Our basic doctrine has remained generally unchanged since that time. Gen. Frank M. Andrews, the first commander of the GHQ Air Force, was outspoken on the subject of airpower. It was at this time that our new concept of air warfare was gaining attention. General Andrews held that national security could best be attained by building offensive rather than defensive capabilities.

History, of course, has proven the validity of the concept. We have had in war dramatic examples of the decisiveness of airpower. Possibly by retracing history from the middle '30s, we can gain an insight into the cause of public confusion about our present doctrine.

Until the formation of the GHQ Air Force, our air units were not in a cohesive organizational structure. This new command consisted of three wings in the ZI. Each wing was composed of all elements of airpower—bombardment, pursuit, attack, and reconnaissance. We were small, usually situated on the same base, and we worked together. We came to know each other, and we understood and appreciated the contributions each made to total airpower.

In those days we identified ourselves with the Air Corps. We had unit loyalty, but we were "Air Corps."

World War II brought tremendous growth. Wings became commands and then grew to be numbered Air Forces. Individuals became specialized and to a degree lost their understanding and appreciation of the contributions of the other complementary elements of airpower. For example, it soon became common to hear airmen refer to themselves first as "Eighth Air Force," secondly as "Air Corps." Each of the numbered Air Forces, you remember, had a distinctive shoulder patch. When we became a separate service, we adopted a new uniform and received many protests against the prohibition of shoulder patches. However, we found that we accrued a dividend in our determination to have an uncluttered uniform. It was impossible to tell visually whether an airman or officer was in SAC, TAC, ADC, or the other Commands.

(Continued on following page)

This condition exists today.

Visually, there is no difference in the blue suits.

But once he begins talking, the individual more often than not will quickly inform his listener that he is in a specific Command.

And sometimes an individual inherits this Command identification without any great effort on his own part. I think I can be considered a prime example of this. Because of my service in the Strategic Air Command, a lot of people think I am only interested in big bombers and have little faith in or use for missiles, tactical airpower, air defense, and the many other essential elements that go to make up total aerospace power. This most emphatically is not true.

I seek weapon systems that I think can do the best job and afford the nation the most protection. I am a military conservative in that I believe we shouldn't discard a proven, reliable weapon system or concept unless we have something that is able to replace it and do a better job. In short, I believe in having protection along with progress.

Identification with a Command is not confined solely to the people now in service. The same tendency is apparent among former Air Force men and other people in civilian life who are earnest supporters of aerospace power.

As you recall, when we became a separate service, we organized into Commands so we could manage our resources more effectively. We did not consider, however, that the functions of the different Commands were separate and autonomous. They were all part of the Air Force and mutually supporting. We in effect gained our independence through public understanding and conviction that all elements contributed to the entire broad spectrum of aerospace power.

During our growing stages there was strong emphasis on Command identification. To a point this was and is needed and desirable. But it must not go to the point where it contributes to an impression that the United States Air Force is a conglomeration of forces, that each type of aerospace power is separate from the other and incapable of action outside a specified role. This gives the impression of inflexibility and nothing could be farther from the truth.

Aerospace power offers the ultimate in flexibility.

The ability to use it for different purposes and to concentrate it swiftly for a primary purpose, if need be, is one of its greatest assets.

Now, if we in our natural enthusiasm have contributed to a cloudy picture, it is time we take some swift and positive action to correct this impression. Since deterrence is credible only if there is understanding and determination, this calls for even greater unity on our part as we advance into the future.

Today, the Air Force is specialized. Many of our people have to specialize in one field due to the growing complexity of weapon systems. As a result, they often remain in one Command for most of their careers and do not get the broad background that was received several decades ago. This trend will become more pronounced in the future. I do not advocate a return to the so-called good old days. I merely point out that technology has tended to multiply the number of parts in our Air Force. Our problem then, as we reach higher and farther, is to maintain our unity of mission and unity as an organization as we approach operational tasks in space. We must keep firmly in mind the fact that aerospace power is indivisible. This is stated in our basic doctrine. This basic doctrine hasn't changed over the years, not because our doctrine has become dogma, but because this principle has stood the test of time and experience.

And we still have the same concept: The purpose of aerospace power is to deter attack against us and, if we are attacked, to destroy the enemy's means to wage war.

This requires aerospace offensive and defensive forces capable of defeating the aggressor's offensive and defensive force. Only this kind of superior aerospace force can continue to be a credible deterrent against attack.

This force should consist of both manned and unmanned weapon systems to give flexible and diversified power. Parallel development and procurement of manned and unmanned systems is therefore mandatory as we update the forces in line with technological developments.

Today, at this moment, the Regular establishment—your United States Air Force—and your Air Force Reserve and Air National Guard units are at an all-time peak of combat readiness.

Through common purpose, mutual understanding, and respect, we are capable and ready.

In closing, I believe we should do these things to ensure that the Air Force remains an effective instrument of national security: First, we must have timely modernization of our aerospace forces; and we must act with vision and daring to exploit technology so as to achieve distinct strategic advantages.

Secondly, we must positively reaffirm our basic concepts. To be a credible deterrent, aerospace power must consist of flexible and diversified forces that have a war-waging and war-winning capability.

And third, we need to restate firmly that the United States Air Force is an entity whose elements all contribute to the aerospace power that is vital for our defense.

Not far from this very spot, in 1776, our infant nation made its Declaration of Independence. I ask that here at this Convention we make a declaration of unity so that we may best serve for the common good of our nation.—END

The above article is General LeMay's address to the Fifteenth Anniversary Luncheon at the AFA Convention in Philadelphia on September 21. General LeMay became USAF Chief of Staff on July 1 of this year, after serving four years as Vice Chief under Gen. Thomas D. White. Before that he was Commander in Chief of the Strategic Air Command. In World War II he served in the Eighth Air Force before transferring to the Pacific to head the B-29 bomber effort against the Japanese homeland. A profile of General LeMay, "Global Organization Man," by Claude Witze, appears in the September issue of AIR FORCE Magazine.

THE SPACE AGE IN PERSPECTIVE

SPACE DIGEST

VOLUME 4, NUMBER 11 • NOVEMBER 1961

SPACE AND NATIONAL SECURITY . . . A Symposium 71

The Threat Is Real
By Trevor Gardner, Symposium Moderator 72
A new and invigorated military space program is an urgent national necessity in the face of Soviet achievements.

Peaceful Purposes: Some Realistic Definitions
By Dr. Edward C. Welsh 73
In a dangerous world, we must have space missions to help *keep* the peace as well as space missions to help us live better in peace.

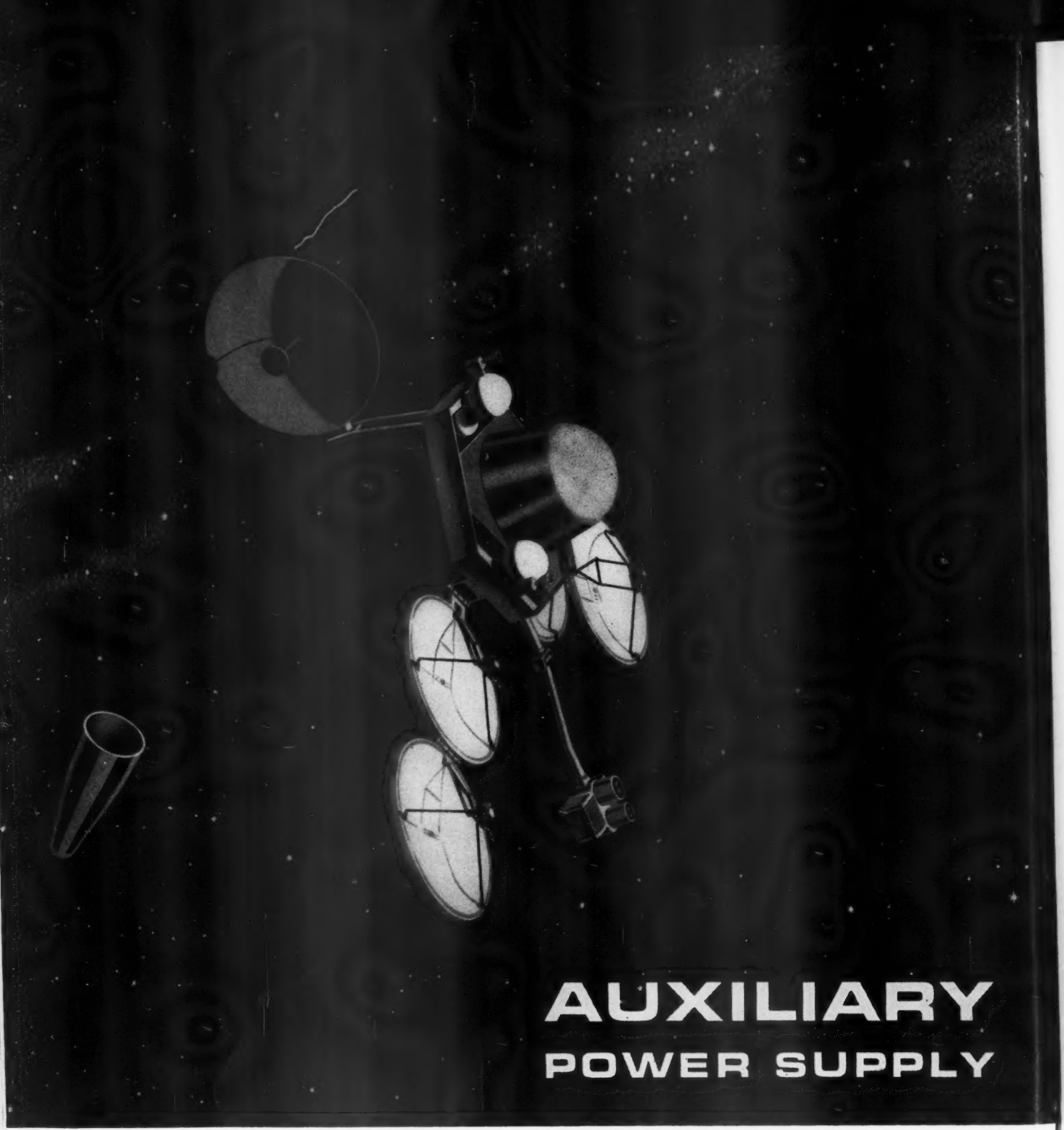
Military Necessity: The Overriding Reason
By Dr. Walter F. Dornberger 75
Space offers an opportunity for the Soviets to break the military stalemate. Realism requires us to face this fact of life.

Using Our Resources to the Fullest
By Rep. Emilio Q. Daddario 77
In marshaling our resources for space programs, we must doggedly avoid duplication and splintering of talent and facilities.

Needed: Manned Operational Capability in Space
By Gen. Bernard A. Schriever, USAF 79
Development of effective functional capabilities in the space arena will be a prime factor in the race for world leadership.

The Panelists Field Some Questions 81
How do we get on the road? . . . How much should we expand the military space budget? . . . Can we beat the Russians to the moon?

Speaking of Space
By William Leavitt 90
Vice President Lyndon B. Johnson, Chairman of the Space Council, takes a first-hand look at some of our national space bases.



AUXILIARY POWER SUPPLY

Direct conversion of heat to electricity offers the solution to the problems of auxiliary power in space.

New techniques of space charge neutralization are being developed at Ford Instrument Company under U.S. Air Force, U.S. Navy and company sponsored studies. This work offers the opportunity to obtain significant power densities with wide spaced plasma power diodes at cathode temperatures around 1200°C. Application studies currently being undertaken involve chemical, solar and nuclear heat sources.1.6

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Ford Instrument guidance and control components participated in these missile and space "firsts": First Free-World man-into-space vehicle (MERCURY-REDSTONE) • First operational ballistic missile (REDSTONE) • First successful launching of a Free-World satellite • First successfully recovered nose cone • First successful Free-World space probe.

A CREATIVE TEAM OF SCIENTIFIC, ENGINEERING AND PRODUCTION TALENT

Space and National Security

A Symposium

WHAT five outstanding Americans—each intimately associated with national space programs and policies—had to say on the military significance of space at the Air Force Association's recent Symposium on "Space and National Security" at AFA's Fifteenth Anniversary Convention and Aerospace Panorama in Philadelphia, has been widely quoted in the national press, including heavy excerpting in the October 9 issue of *U. S. News & World Report* and in a special space supplement in the October 8 Sunday New York *Times*. For the record and convenience of SPACE DIGEST readers, we present on the following pages their complete remarks, plus an abridged transcript of the questions to the panel which followed the formal presentations.

Moderator of the Symposium, held September 22 at Philadelphia's Convention Hall, was Trevor Gardner, now chairman of the board and president of the Hycon Manufacturing Company of Monrovia, Calif. A native of Cardiff, Wales, who became an American citizen in 1937, Mr. Gardner was a principal architect of US missile programs, and Assistant Secretary of the Air Force for Research and Development in 1955-56. A leading space planner today, he served on President Kennedy's Space Task Force early in 1961 and was chairman of the Air Force's Space Study Group, which has analyzed the various military potentials of space technology.

Leadoff speaker was Dr. Edward C. Welsh, executive secretary of the National Aeronautics and Space Council, top national advisory-policy group on aerospace matters, chaired by Vice President Lyndon B. Johnson. A native of New Jersey who holds a Ph.D. in economics from Ohio State University, Dr. Welsh has held a number of important governmental economics posts and is recognized as a leading architect of Japan's postwar recovery. He was a legislative assistant to Sen. Stuart Symington of Missouri, in which post he played an important role in defense investigations, prior to assuming his present position early in 1961.

Following Dr. Welsh on the program was Dr. Walter F. Dornberger, vice president and chief scientist, Bell Aerosystems Division of Bell Aerospace Corporation, internationally known for his pioneer work in missilry and astronautics before and during World War II in Germany, where he commanded the famed Peenemünde Rocket Research Center which developed the V-1 and V-2 weapons.

Dr. Welsh and Dr. Dornberger devoted their presentations to the analysis and significance of the military challenge of Soviet space achievements.

The two other speakers, Rep. Emilio Q. Daddario, Democrat of Connecticut and a member of the House Committee on Science and Astronautics, and Gen. Bernard A. Schriever, commander, Air Force Systems Command, geared their presentations to the problems of proper American response to the military challenge of Soviet space feats.

Congressman Daddario, a vigorous proponent of maximum utilization of national resources and personnel in space programs, won his law degree in 1942 from the University of Connecticut. During World War II, he enlisted as a private, served with the Office of Strategic Services as an officer in intelligence assignments, and earned a Legion of Merit Medal. He was mayor of Middletown, Conn., in 1946-48, served in Korea, and was elected to Congress in 1958, reelected in 1960.

General Schriever, a native of Germany raised in Texas, won his wings in 1933. A one-time commercial airline pilot and holder of a master's degree in aeronautical engineering from Stanford University, he was the first commander of the Air Force Ballistic Missile Division of the old Air Research and Development Command, and managed research and development of our Atlas, Thor, Titan, and Minuteman missile systems. He was named to his present post in 1959.

"We must urge . . . our leaders . . . to permit us to embark upon a new and invigorated military space program. . . ."

THE THREAT IS REAL

TREVOR GARDNER, MODERATOR

AS WE sit here on this twenty-second day of September 1961, our nation is facing an imminent and dangerous Soviet space threat. We are late in awakening to this threat. We are deluding ourselves by declaring that we are ahead in space science, but the Soviets just happen to lead us by a few years in the development of large boosters and man in space. We cannot afford to continue to lag in the field of military space development.

Our President has already committed the nation to a major national effort in space exploration—the lunar landing and return program. Our national leaders are now confronted with the need for a similar commitment with respect to US military space superiority.

Let us direct our attention to the actual "score" in the space achievements of the US and the USSR.

The USSR has placed fifteen devices in orbit with a total announced payload of 109,000 pounds. The US has placed fifty-one devices in orbit with a cumulative payload of 30,000 pounds plus 29,000 pounds of engines and tanks. The maximum single payload we have been able to place in orbit is 4,600 pounds, compared with 14,292 pounds for the USSR.

Now let us look at some recent "ancient history." On August 19, 1960, the USSR placed a 10,120-pound spacecraft in orbit and caused it to land at a time and place of their choosing. A payload of this size could have been a major nuclear weapon. We had no means then, nor do we have any capability now, to neutralize, capture, or destroy such spacecraft if they are hostile. Nor is any such capability under urgent development by our government.

Since August 19, 1960, the USSR has launched eight spacecraft of this general character, including the most recent launchings which carried Gagarin and Titov.

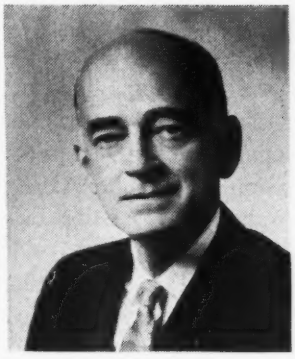
On September 1, 1961, the USSR resumed nuclear testing, and to date has conducted fourteen tests in the atmosphere. One possible objective of these tests is to perfect a "gigaton" (fifty-100 megaton) bomb.

Almost simultaneously the USSR resumed a major ICBM test program in the Pacific in which two 7,500-mile successful tests have already been accomplished. Their announced objective for this program is to test a new and even larger booster. In view of recent Soviet behavior concerning resumption of nuclear tests, a real possibility exists that a forthcoming test in this new ICBM series could involve the explosion of a giant nuclear warhead, instead of a dummy payload.

In the face of these two test programs and their grim implications of large thermonuclear bombs in orbit or in ICBMs, we must solemnly reexamine our military defensive and offensive space plans and urge our national leaders to permit us to embark upon a new and invigorated military space program.

We must also reexamine our civilian space program (particularly the lunar program) so that we will gain the maximum military yield as a dividend from this investment.

It is our purpose here today to address ourselves to these and other questions involving the military potential of the national space program.—END



"We do not dare leave [space supremacy] to those who would destroy in order to gain power. . . . We do not dare to leave empty-handed those who would build in order to retain freedom. . . ."

Peaceful Purposes: Some Realistic Definitions

DR. EDWARD C. WELSH

TODAY, I am scheduled to launch a few capsules of fact and views regarding the national space program. Any messages conveyed during this brief orbit will be my own and should not be thought to come from the National Aeronautics and Space Council, as such.

By way of introduction, it might be useful for me to make three broad generalizations which, in a sense, express my philosophy of this challenge.

- *First,* we are in a space race, and it is absurd to pretend that we are not. We are, moreover, not in the contest just for the fun of racing, but rather for our survival as a nation determined to protect its freedom and also as a nation determined to maintain and increase the margin of the material and spiritual advantages of a free society. We have no honest choice to do otherwise in view of the Communist threat. Having finally decided to run instead of walk, we can, and I believe we will, win the race.
- *Second,* we should be making a vigorous effort in space development, in space exploration, and in space competence, even if no other nation were doing anything at all in space. The potential benefits flowing from this effort are so great that we would have no right to deprive our children or future generations of them, regardless of what the Communists decided to do.
- *Third,* I believe that the values received from our space efforts will exceed the costs many times over. These values will be reflected in education, in medicine, in metallurgy, in international prestige, in diplomatic negotiations, in defense against aggression, and in higher standards of living generally. We can get all that for an annual expenditure averaging perhaps one percent of our gross national product.

Those generalizations indicate my attitude toward the space program. Now, I want to draw your attention to some aspects of the space picture which may fit more specifically into the discussion anticipated here today.

The National Aeronautics and Space Act of 1958 states that it is the policy of the United States that "activities in space should be devoted to peaceful purposes for the benefit of all mankind."

That is a sound policy for any vigorous, peace-loving nation. Even though it is sound, however, I know also that it is sometimes misinterpreted. It does not mean that space has no military or defense uses.

I believe that the Defense Department's space vehicles such as ICBMs, Midas, Samos, and others, in the hands of the United States, are designed for peaceful purposes. Nothing is more essential for peace than the capability to discourage or deter attack.

In my view, we do *not* have a division between peaceful and nonpeaceful objectives for space. Rather, *we have space missions to help keep the peace, and space missions to help increase our ability to live well in peace.*

The Space Act itself goes on to recognize this dual approach to peaceful uses of space in its subsequent language. For example, it states that a civilian agency (NASA) shall exercise control over aeronautical and space activities, *except* that the Department of Defense shall have the responsibility for those activities primarily associated with our national defense. Moreover, the Act requires that there be an exchange of information on space between the Department of Defense and the National Aeronautics and Space Administration. If only one agency were expected to be

fully responsible for space programs, there would be no occasion for that provision.

Furthermore, the Act created the National Aeronautics and Space Council to advise and assist the President in a whole series of functions involving policies, plans, and programs of all departments and agencies engaged in space activities.

While I do not want to dwell upon it, I do pause to mention a historical footnote. When the proposed language for this Act was sent to the Congress by the Executive Branch of the government in 1958, it was phrased so as not to give clear responsibility to the Department of Defense for space activities primarily associated with military missions. It is possible that this omission was a result of careless drafting or evidence of disinterest in military application to space or just optimism regarding our military position relative to that of the Communists. In any event, the Congress saw the error and changed the language.

As I just pointed out, the Space Act created a Space Council. There also was no provision for this policy-level organization in the original bill. As most of you know, even after the Act was passed, the Space Council was left dormant, and it was not until the new Administration came in that the Council was given the "go-ahead" to function.

The Council's responsibilities to advise and assist the President are as broad and comprehensive as the President may request. They are not limited to one or two agencies of the government, but rather are applicable to the entire "aeronautics and space field." For example, in one policy assignment handled by the Council, nine government agencies were directly involved.

It is within the scope of the Council's functions to look into matters of duplication and to make recommendations for action regarding such duplication. In my judgment, it is more important to cure duplications of omission than duplications of performance. In the latter the job gets done even though it may be done wastefully, while in the former the job doesn't get done at all.

The following are some of the actions in which the Space Council has participated, since its revitalization almost six months ago:

- Drafted an amendment to the Space Act, which put the Vice President on the Council as its Chairman. The other permanent members are the Secretary of State, the Secretary of Defense, the Administrator of NASA, and the Chairman of the AEC;
- Recommended the policy decision to accelerate the large booster program and proceed toward a manned lunar trip under NASA's direction;
- Coordinated and submitted to the President an over-all new space program which was presented to and passed by the Congress. This included the new project for a large solid-fuel rocket to be developed by the Department of Defense;
- Assisted in the decision to include AEC's nuclear power unit in a scheduled Defense Department launching;
- Prepared and recommended to the President the communications satellite policy;
- Prepared and recommended to the President a policy on the Defense Department's West Ford project.

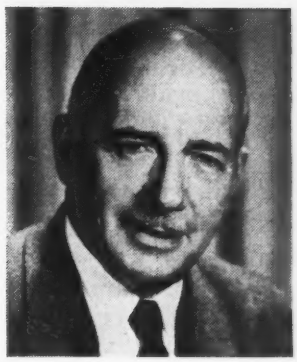
I have heard again and again convincing statements as to the advantages for some types of missions that manned aircraft have over manned missiles. Many of these same arguments stand up equally well in comparing manned spacecraft with unmanned spacecraft, and in both cases we need both.

The advantages of men in space vehicles seem to me to be obvious. There are observations, maneuvers, actions, and inactions concerning which decisions can be made by men and cannot be made by instruments alone. These facts are equally applicable, in my judgment, whether the spacecraft is on a mission to maintain the peace or on a mission limited to increasing our scientific knowledge.

I conclude these brief remarks with a perhaps unsophisticated but nevertheless alarming thought. The Communists have expressed their determination to dominate the world, and they will use all methods available for attaining that objective. We are already well aware of their use of space accomplishments as well as pronouncements and other actions to increase tensions and influence negotiations. They now have manned spacecraft, and they are pushing to increase this capability. You may be sure that they are not spending such effort and resources unless they believe firmly that it can be justified in terms of world domination. Manned spacecraft can be used, in the hands of aggressors as well as in the hands of defenders, for active military purposes. In the hands of Communists, they can also be used for blackmail purposes.

We do not dare leave this field to those who would destroy in order to gain power, just as we do not dare to leave empty-handed those who would build in order to retain freedom.—END

"The Russians recognize [in space] an opportunity for obtaining a new and unique military supremacy. . . ."



MILITARY NECESSITY: The Overriding Reason

DR. WALTER F. DORNBERGER

THROUGHOUT history it has been of vital importance for any great, growing, and prosperous nation to gain military superiority in the three areas in which military operations take place: on the ground, on the seas, or in the air. Since the last war, space has been added to these areas as a fourth potential field of military operations.

Therefore, in spite of all the propaganda to the contrary, we should have no doubt that the Russian political and military strategists are aiming at military superiority in space. In the last fifteen years the decisive role of space for the domination of earth has become increasingly evident. Let me quote just two statements, the first one made by our President a half year ago. President Kennedy said: "Who has superiority in space has superiority on earth." The second statement, made two months ago by the Secretary of the Air Force, the Honorable Eugene Zuckert, was: "The United States and the free world must ensure that the means of earth domination inherent in space mastery not be pre-empted by the enemies of freedom. . . . The lesson is that through and from space, earth can be dominated."

Up to now, the Russian space effort has been thoroughly planned far ahead. It is obvious that scientists are not leading this effort, but rather political and military strategists on the highest level. This can be easily proved by the timing of their more spectacular achievements in space—a timing which has fitted so effectively into the overall Russian political strategy of the last few years.

Looking at the Russian space effort, we have to keep in mind that all participating agencies have to follow the directives given by the highest Soviet authority, therewith serving the political ends of this authority, whose objective is world domination.

History should have taught us that moral restraints such as treaties or avowed peaceful use of space never have or never will influence the actions of a dictator. Any means will be employed which lead to the final objective.

We can be sure that the Communists have realized that a military stalemate now exists, which may prevent them from ever achieving their goal through conventional political or military means. They know that starting a modern war today means their destruction also. They know they have practically no superior diplomatic or military means available to follow through successfully with their aim at world domination either peacefully, by threat, or by war. In such a situation the Russians would be utterly foolish not to direct their efforts toward military superiority in space. According to Khrushchev's repeated statements, they are convinced they are ahead of the free nations of the world in the conquest of this space. Here, I am sure, the Russians recognize an opportunity for obtaining a new and unique military superiority.

It is a fact that space, for the military strategist, is just an extension of his field of military operations into a vertical direction. When we consider, for example, the space between the upper layers of the atmosphere and the lower Van Allen belt, this area alone will be ten times bigger than all other fields of military operations combined. In this area, without encountering yet-unknown hazards, a whole arsenal of the most modern manned, as well as fully automatic, weapon systems could be stored and deployed, some remaining in space permanently, some recoverable and reusable.

Among many others, reconnaissance, weather, navigation, communication, and detection satellites as well as spacecraft for bombardment, inspection, interception, command, maintenance, and supply could contribute to this military space force. If an enforced agreement with Russia about the peaceful use of space cannot be obtained, we will find one day this variety of defensive and offensive weapon systems established and ready to operate.

I see today no unsolved fundamental technical problem that would prevent the Communists from achieving such a goal within the next ten years.

Step by step the Soviet space program, starting shortly after the last war, is developing this capability. Today they place payloads manned and unmanned in space, five times heavier than ours. They have the reliable, high-thrust boosters as well as the accurate navigation and guidance systems to do it. By clustering their existing engines and by using solid rockets to assist takeoff, they will be able in a few years—when we are just starting to use the Saturn—to increase this payload capability to one hundred tons for close orbits around the earth. With this payload capability, it will be easy for them to develop, test, and operate manned, maneuverable, recoverable military satellites with high reliability and ability to rendezvous. Having solved this rendezvous problem, there should be no major difficulty in putting the military space force previously described in action.

The Russians already have launched a deep space probe to Venus from a satellite in a parking orbit. It would be just as easy to launch payloads toward earth. With Titov's twenty-four-hour flight they proved to be far beyond the study phase in bioastronautics and well ahead of our man-in-space program. The experience gained in these Russian space achievements—supposedly serving only peaceful purposes—by one single directive from the strategists can be fully utilized in the development and operation of any needed space weapon system.

At the International Law Association meeting in Hamburg, Germany, in September 1960, Professor Vladimir Koretzki answered when he was asked about the Russian thinking with regard to the upper border of air sovereignty: "The upper border of air sovereignty is fixed by the necessity of any nation to protect its country."

That means the Russians don't recognize any limits in space. They don't care if any one of our space systems flies on a course over Russia or not. As long as *they* regard it as a threat, they will try to interfere with its mission.

We don't know which Russian space weapon systems will have top priority, but we can be sure that in the very near future, when the Russians are ready, another U-2 incident will occur, this time in space, and if they choose, at the right political moment for the Russians. The target may well be any one of our presently operating or planned satellites, and there is not much we can do about it with our available weapon systems.

Or the Russians may choose a different approach. We may not even learn that a Russian interception took place. They may deny everything and we have no means to prove it. They may try to keep this part of their space effort secret. Certainly they will camouflage it. They may have the ability to guide their manned interceptor spacecraft to any spot in near space, to land at will, and wherever they want. They may keep their interceptor satellites silent and make them hard to track by optical means or by radar, which should not be too difficult.

Out of this first military action in space, a kind of "hide-and-seek" war in space will result, first without too much effect on the situation on earth. But the Russians will not rest until they have obtained complete control of the space effort of the free world. Our space systems, such as reconnaissance, weather, communication, navigation, detection, and interception satellites, which are so vital for our defense and the survival of our nation, will be wiped out of space.

This way, the Russians will achieve military superiority in space. The impact on the political situation on earth can hardly be overestimated. By doing what the Russians are capable of doing in space within the very near future, by wiping out our space systems, they will indirectly weaken our military positions on the ground, on the sea, and in the atmosphere. They will change the military balance between the communistic and the free world in their favor. They will achieve their final goal of dictating the conditions of survival to the free world without a war and without firing a single shot on earth.

In this Russian capability in space, used as a tool to obtain world domination, I see the biggest threat of our time. To counteract this threat in time by appropriate measures is certainly the greatest challenge for our country.

How will we organize, how support financially, how best plan, how will we manage our space effort, what are our goals, where to put the em-

phasis? These are some of the vital questions for which we had better have the answer today.

Space will be conquered for scientific, political, prestige, propaganda, economic, and military reasons. All are interrelated. All are important. But I think the military reason is the only vital one. We have to defend the right to be there. That has to be recognized. We have to do everything we can to prevent the Russians from taking over and from controlling space.

I am not advocating that any one of our great civilian space efforts should be canceled or pursued with less eagerness in favor of the military effort. We have to pursue both programs.

For one single reason: What good would it be, if we really send a crew of three men within the next decade to the moon, getting a tremendous scientific and prestige gain, when coming back, these Astronauts may find that the free world does not exist any more?

Let me wind up my short statement with a quotation from a speech the Prussian Soldier King, Frederick II, the Great, made in 1760: "God will always be with the strongest battalion."—END

"People cannot believe that the Russian space effort, once fully developed, will not be used for military purposes as part of their arsenal of weapons and vehicles. . . ."

Using Our Resources To the Fullest

REP. EMILIO Q. DADDARIO

DR. WELSH and Dr. Dornberger have spelled out the threat that confronts us as the result of the Russian space effort. I need not take the time to reiterate their views in support of the idea that such a threat exists.

It is obvious that the Russian space program has increased the prestige and power of that nation throughout the world. One needed only to view the first Sputnik as it hurtled out of the western sky—as I did with my children and my neighbors—to be impressed. But on that day as I looked at those small faces turned to the sky, I could not help but feel that the excitement generated was one of wonder and not of fear. Since then, the Russians have put up twelve Sputniks. Over sixty-five percent of the Sputnik satellites have carried living specimens. This series has included a dummy mechanical man, biological tests with living animals, and radiation instrumentation. The eleventh flew Gagarin; the twelfth, Titov. As these advances have been made, the wonder has become saturated with fear. For people cannot believe that the Russian space effort, once fully developed, will not be used for military purposes as part of their arsenal of weapons and vehicles.

I have for some three years now heard conflicting and diverse views as to how this threat should be met. Indeed, I have often heard it pronounced that the Russians have no intention of using their space capabilities for military purposes. If we were to follow that school of thought, we could one day wake up to a sky full of armed satellites hovering impregnable in space over the critical centers of the free world, and from that moment freedom would be lost forever. I would doubt if there is one United States intelligence estimate that suggests that we should develop our own strength on the basis that Russian intentions in space are peaceful.

As one step toward meeting the Russian challenge in space, we must solve the problem of anti-missile missile system. Our defensive capacities must include such a system as a beginning toward the preparation of a defense against satellites.

We already have a formidable capability available to us as we face the Russian challenge. Our soldiers have learned to live dug into the Arctic ice pack for months on end. The wide variations between heat and cold on a moon constantly bombarded by meteorites will most likely force us to live beneath its surface. These skills learned here

on earth can be readily transferred to use in the moon program.

Similarly, the Navy's experience in submarine work, where men live and operate in closed environments, is most valuable to research. The test on long undersea voyages with an atomic submarine is comparable to experiences that will be undergone in space travel.

The Air Force offers the most valuable talents, for its mission has been to place man in the widely divergent environments in which he must exist. It has put man through the stresses of extremes of temperature, speed, and endurance. Space is a natural challenge to the Air Force, and the target of the moon, Mars, and Venus are logical steps to the conquest of this frontier. For our security depends on the adaptability of our defense capabilities to use all environments and to prevent them from being used against us. Abundant technological know-how is available in private industry. Research and development skills are of the highest order, and only the call and the direction to be of service is awaited. And in the establishment of NASA we have a civilian agency with exceedingly great opportunities to assist in this effort.

It has always been my idea that there is nothing mysterious in this challenge in space and that our technical resources—civilian and military—are available in sufficient amounts not only to catch up to the Russians but to surpass them before they can seize space for their exclusive use.

What then must we do?

First of all, we must utilize all of the skills, resources, and facilities available to us. The Space Act of 1958 says that activities in this field must be conducted in such a way that we achieve the most effective utilization of the scientific and engineering resources of the United States, with close cooperation among all interested agencies of the United States in order to avoid unnecessary duplication of effort, facilities, and equipment.

This legislative directive must be strictly enforced. Every government laboratory and the personnel attached thereto must be utilized to the fullest. Additional laboratories should not be built unless they are absolutely necessary. There should be the minimum dislocation of personnel. Ways and means must be established to support necessary existing projects while we utilize available personnel and facilities to meet this new challenge and develop the additional base for the intensified effort. For while I have said sufficient capacity exists, there is not the time to allow for inefficiency or misdirection.

By Presidential directive dated March 6, 1961, the Air Force was made the primary DoD agency to manage space programs. In this respect the directive carried out, I believe, the principle set forth in the report of Dr. Jerome Wiesner and his committee that recommended the President establish a single responsibility within the military establishments for managing the military portion of the space program. It is my belief that this should be carried further to be made effective. One Department of Defense representative should be named to deal directly with the National Aeronautics and Space Administration in all matters affecting the use of facilities and personnel to accomplish missions, both civilian and military.

In that way, and under such circumstances, we can achieve the most effective utilization of the scientific and engineering resources of the United States as we approach the accomplishment of national goals in space.

Let us consider as an example the moon program as such. President Kennedy has assigned a top priority to this project. Yet, both civilian and military experts who have discussed it have mentioned many intermediary problems that exist which must be solved as part of this effort. Civilian authorities have testified that these should be taken in order and solved before we try the more ambitious problems. One scientist has testified that there are basic biological investigations that are going to have to be made if we seriously mean to send man to the moon and to the planets. Observers more aware of the Air Force capabilities and the Air Force program have stated that the lunar project is a natural focus for the vast space activity. They feel, as do the civilian scientists, that in order to achieve a manned lunar landing and return, certain basic space capabilities must be developed. These are the same capabilities required for a large-scale military, scientific, and technological utilization of space. They are military necessities and vital to our national security in the opinion of no less an authority than our moderator, Mr. Gardner.

Yet, I think there is a basic difference in approach between the civilian and military proponents. The civilian scientists who have testified in this area in the past have appeared to me to be cautious to an extreme. They wish to move slowly, step by step, to reach their goal, without the necessary urgency. The Air Force, however, because of its experience in taking man into increasingly hostile environments, wants to recognize a specific terminal goal of the moon landing as the logical

extension of progressive development of greater capabilities in the uses of space.

My concern is to move together on these two paths. We must make sure that the civilian approach does not overlook the capabilities which are militarily useful and necessary in its scientific quest. So far, we have heard much of the usefulness of instruments in American programs with occasional efforts to downgrade the role of man. Yet, I submit that beyond the question of exploration of this environment must always lie the question of how man can control the uses of that environment to enhance his own security and well being.

There is, of course, the clear and obvious reason that the development of space has identified it as another avenue of approach in the military sense, to be recognized in security planning. The position of the moon makes it a logical, critical terrain feature in this possible theater of operations. However, just as important from the view of space science are the data we will learn from lunar exploration, by instrument as well as by manned probes that may lead to solutions of questions regarding extraterrestrial life, the origins of the solar system and of life itself, and the exploitation of resources which may lie fallow in and among the planets for the benefit of mankind.

We have no alternate choice. We are bound by the ingredients of time, money, manpower, and materiel. They offer challenges in themselves that must be met. How well we manage them will determine our success. The development of outer space is a national goal. The civilian and the military must work side by side in this space effort and break down any barriers that exist between them. Let us remember that when our big boosters roar upward at Cape Canaveral, the words lettered on them will not read "NASA" or "Department of Defense," but simply: "United States."—END

"The development of effective functional capabilities in space will be a principal factor in the continuing struggle for leadership of the world. . . ."

Needed: Manned Operational Capability in Space

GEN. BERNARD A. SCHRIEVER, USAF

I BELIEVE the threat to our national security discussed by the other panel members is a major cause for concern. The development of effective functional capabilities in space will be a principal factor in the continuing struggle for leadership of the world. We have already seen that the Russians regard their space deeds with a militant pride. Their successes in space are presented as proof of the Communist credo that history is on their side and communism will rule the future world. We have the ability to prove them wrong, if we use our resources wisely.

It is not generally appreciated that in the last few years we have developed great resources which can be devoted to any one of several courses of action we may choose to develop a strong defense capability in space. Perhaps the best known of these resources are the missile test ranges which give us the ability to support space programs devoted to both military and civilian objectives.

In carrying out our ICBM programs we also have developed the capability to procure large modern systems which employ modern technology and, even more important, achieve reliable operational status with these systems after they have been delivered to the field. The experience gained in these programs covers the whole spectrum of research, development, procurement, transition of the systems from technical specialists to operational units in the field, and logistic support throughout all phases of the programs.

Perhaps the most invaluable asset of all is the corps of the Air Force officers and men in whom this experience is embodied. We have learned

techniques of management which permit us to bring new systems into the inventory in a few short years as we did with our ballistic missiles.

But there is no short cut to the creation of a team of dedicated and experienced men with a tradition of accomplishment. The Air Force has a highly competent team trained in the skills required to develop the necessary military capabilities in space. These people are accustomed to working with the sense of urgency necessary in programs vital to the national security.

In carrying out our national space program, certain basic functional capabilities are necessary and fundamental to both military and civilian programs. The best approach to our military space program is a mixture of unmanned and manned space vehicles. More emphasis on manned spacecraft is required. We must be able to use space on a routine, day-to-day basis. In order to develop this ability we must begin by developing the ability to place large payloads in space, the ability to navigate and maneuver spacecraft, the ability to go into space and return to earth at times and places chosen to support a selected mission, the ability to rendezvous in space and accomplish refueling or cargo transfer; in short, to transport, use, and support man in space.

The unique abilities of man to observe and to use judgment are essential. Most important is the ability of man to exercise control based on his judgment. Man's abilities are necessary to support our national objectives and national security in the space age.

Along with development of the ability to place man in space in a functional role, a broad development program for components and techniques must be carried out. This will permit the combination of the experience and knowledge gained in placing man in space in a functional capacity with a choice of developed components and techniques to give us national defense capabilities in space.

I believe it is clear today that we must be able to observe or inspect satellites and determine whether or not an unidentified satellite is hostile or friendly, just as we are able to identify unknown aircraft today. Should a satellite be determined to be hostile, then we must have a capability to neutralize it. If we cannot deal with such satellites, the ability of the nation to exist and preserve its essential values will be severely compromised or nonexistent.

Finally, the key to rapid utilization of space by man for military or civilian purposes is flexibility. We must not design our space vehicles and programs just to achieve those objectives which we can define now. We must design the vehicles with enough capacity to rapidly adapt to or incorporate the vast new knowledge which will flow from our space program. A manned space observatory should be designed so that the composition of the crew of observers can be modified or completely changed to accomplish new or additional missions. Such an observatory should have provisions for the addition or replacement of equipment simply and quickly in order to respond to new knowledge or new requirements.

The achievement of these capabilities in space will enable us to ensure that space is not used for aggressive purposes—provided we achieve them in time. This, I feel, is an urgent matter, and it may require that we rethink our traditional approach to the use of technology.

Historically, we have tended to overestimate what we could do on a short-term basis and to grossly underestimate what we could do on a long-term basis. As a result, the United States has been notably slow to recognize the military application of new inventions. This was an adequate philosophy for the days when oceans were real barriers and gave us time to mobilize after the outbreak of war. But today, technological surprise could be fatal.

Two of the most significant technical achievements of this century—the airplane and the liquid-fueled rocket—are American inventions. Yet in each case their first military application was made by other nations.

After the Wright brothers flew at Kitty Hawk, more than three years passed before the US Army decided to buy an airplane. Even then the military potential of the airplane was not realized. When World War I broke out, and when American pilots flew in battle, they flew foreign aircraft exclusively. No American-designed plane saw combat during World War I.

The work of Robert Goddard, inventor of the liquid-fueled rocket, was neglected in the US but was followed with interest overseas. By 1929, three years after Goddard's first successful test flight, Germany had embarked on a rocket program. Soviet rocket research started in 1933 and had recorded substantial accomplishments by 1935.

By 1939, Germany was spending one-third of her entire aerodynamic research budget at Peenemünde alone. She had 12,000 workers there and at least 1,000 qualified researchers in rocketry elsewhere in the country.

In the same year, Goddard had five technicians. In the whole of the United States there were probably not more than twenty-five people working with liquid rockets.

The United States finally was forced to recognize the military significance of the rocket after V-2s started to rain on London. Soon American scientists began to learn of Goddard's work through reading captured German documents. Nevertheless, little more than a decade ago the ICBM was called "a fantastic proposal." Early indications that the Soviets might be producing such a weapon was largely ignored.

I have cited these examples to indicate the danger that lies in inadequate military planning for the future. Now we may find ourselves in a similar position in regard to space. No one can predict what benefits its exploration will bring to mankind, but I am certain they will be immense. At the same time, space most certainly has potential military use.

We need to press forward vigorously with our national space effort. We should recognize that there is no inherent difference between basic military and nonmilitary space technology. The same hardware and techniques used to send up a scientific capsule can also be used to orbit an early-warning satellite. The same techniques that can send a man into space as a scientific observer may also send him there in a military role.

What really matters is not the technology but the intent. Our intentions as a nation are peaceful and are known to be so. We should not be afraid to develop whatever systems are needed for our legitimate self-defense—and we should not be afraid to give them priority.

Only by being strong can we preserve the peace. This is the primary objective of the military forces today. When the Strategic Air Command was formed, the people of America understood that "Airpower Is Peace Power." We need a clear understanding today that "Spacepower Is Peace Power." Spacepower must become a vital part of our national strength and security.—END

How do we get on the road? . . . How much should we expand the military space budget? . . . Can we beat the Russians to the moon? . . . Is there a military man-in-space program now? . . . Is space really worthwhile?

The Panelists Field Some Questions

Following the panelists' presentations, written, unsigned questions from the audience were put to the panel by Symposium chairman Trevor Gardner, and all panelists were free to answer or comment on their colleagues' answers. What follows is an abridged version of the stenographic transcript of the question-and-answer portion of the Symposium.

CHAIRMAN GARDNER: What must we do to get us on the road to a military space capability? Please spell it out.

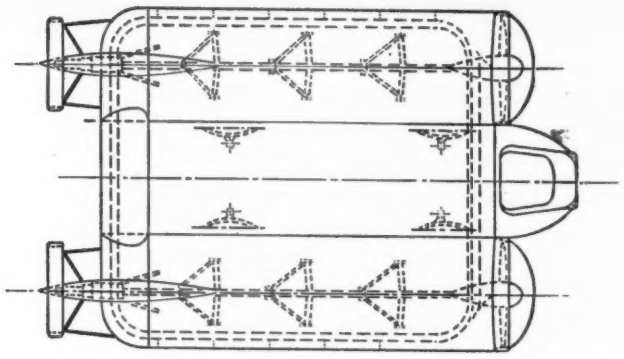
GENERAL SCHRIEVER: I pointed out that I felt that from a program standpoint there were several areas that would require very great emphasis during the next few years.

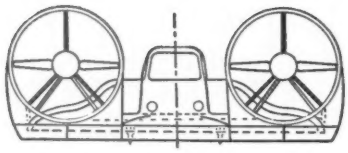
The first is in the area of large boosters and the ability to put large payloads into orbit and do this more economically. This certainly can be achieved as part of the lunar program.

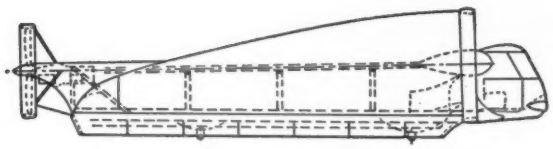
Secondly, I stated the need for man in space. Here we have not had a program that has had enough depth. The Mercury program has been a high-priority one, but there are many other things that can be added, other reentry techniques. The Dyna-Soar glider is one. There are many things that can and must be done, to a large extent as part of the lunar program.

We need to put a great deal of effort in certain techniques. Before we can have a defensive capability in space we must be able to rendezvous. We must be able to inspect. We should be able to dock, and we should be able to transfer either materiel or people from one space vehicle to another.

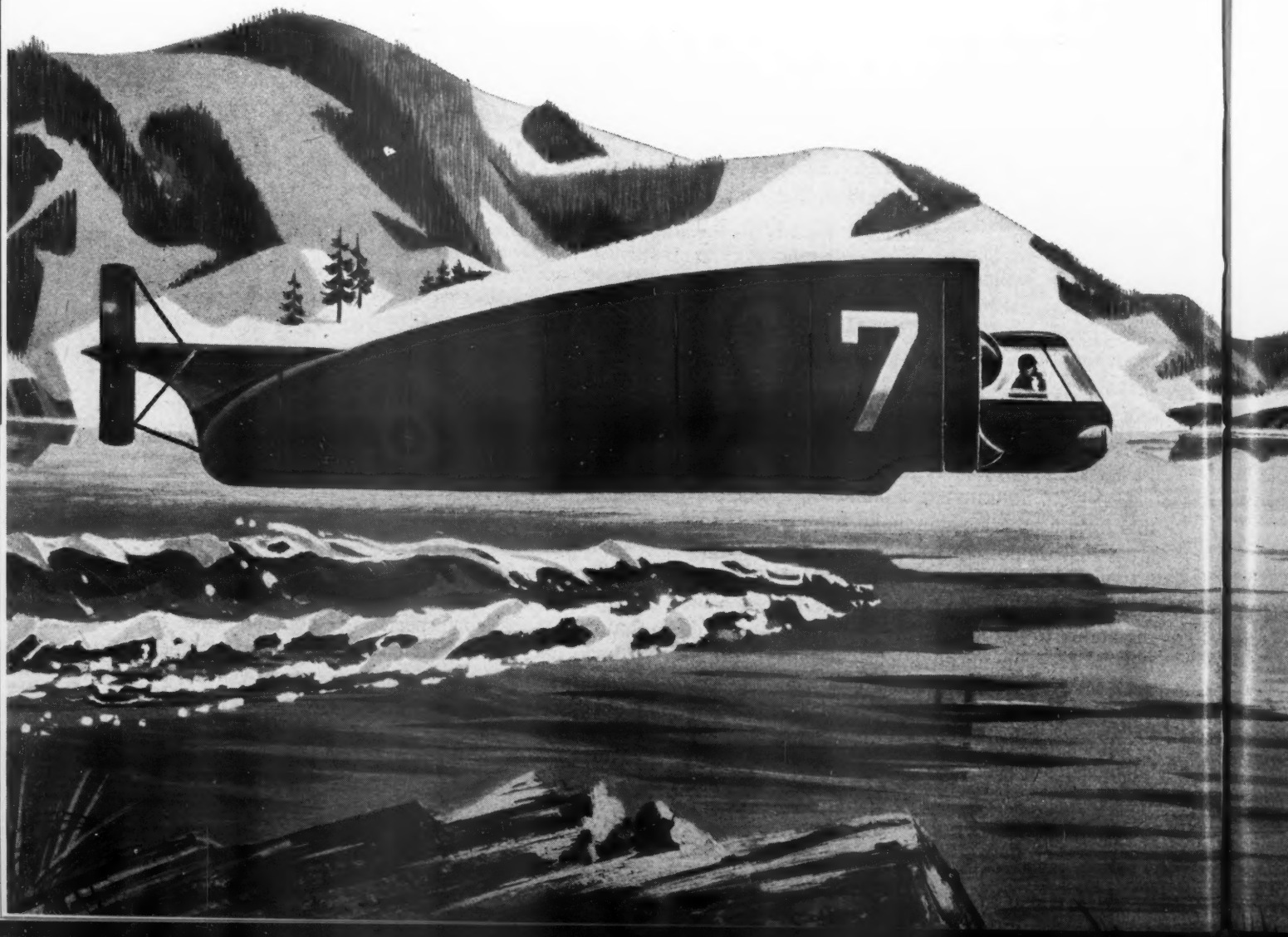
These are specifics in terms of programs. Some of these will be a part of the lunar program and







dependable transportation...come hill or



l or high water

In 1959 the Army asked Aeronutronic Division of Ford Motor Company to investigate the practicality of air cushion vehicles.

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AERONUTRONIC DIVISION Ford Motor Company, DEFENSE PRODUCTS GROUP

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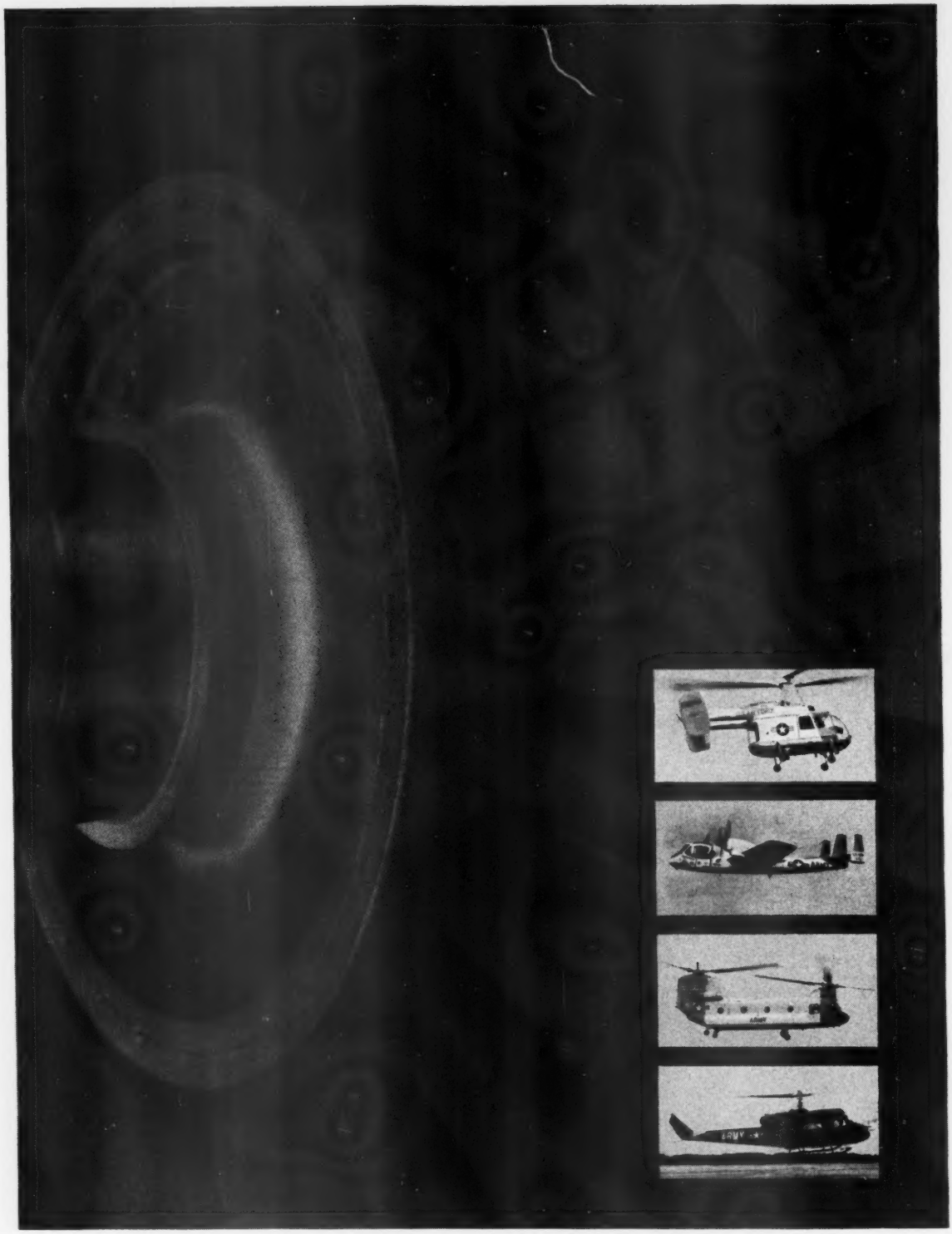

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Avco

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Convention Hall, Philadelphia, September 22: AFA President Thos. F. Stack (standing) introduced "Space and National Security" panelists, who may be identified by placards. They addressed a capacity audience of 600.

some perhaps will not be included and will have to be picked up separately.

CONGRESSMAN DADDARIO: In the background of all the remarks made here, there has been a partial answer to that question and no one could possibly spell out today in the time allotted a step-by-step program.

In the first instance, we already have in the Air Force a forward look toward the ends involved. For example, two-thirds of the people in this country who have capacities in the life sciences, which General Schriever has christened bioastronautics, are in the Air Force; and these people are working presently with animals and with the capacities that they have available to them to create the environment in which man can live in space and become a useful part of the marriage of the man to machine as we reach that particular point.

There are also in the man-on-the-moon program the funds necessary to spread over a period of years so that when we do reach the moon we can, if this program is properly integrated, achieve not only the civilian goals involved but also the military goals which are in the intervening places between here and the moon.

We have the technical skills and the capacities both in and out of government, both military and civilian, properly bound together, to accomplish this end within the time allotted. It becomes necessary only to take those skills, capacities, and personnel we have and properly utilize them.

CHAIRMAN GARDNER: What is the panel's view of establishing another Von Neumann-type committee to ramrod a top priority for military control of space? Is this a job for the Space Council?

DR. WELSH: It could be a job for the Space Council. But I don't necessarily find a solution to problems coming from the appointment of another committee. We have several in Washington now.

CHAIRMAN GARDNER: How much should the military space budget be expanded?

DR. WELSH: It is my guess that the space budget that was obtained this year—over-all, military and civilian—was probably as much as could be obtained, and in the sense of introducing urgency into the program I believe that it's about what could be used. However, in the coming year it's going to be substantially larger. I don't think it's going to be a very significant portion of the total gross national product at any time. We've had a whole lot of comments about $20 billion, $30 billion, $40 billion a year for space. There hasn't been anything programed or thought of or considered in that size or in that scope.

CHAIRMAN GARDNER: Why do we not have a single competent head over all space responsibilities and resources to do the job?

CONGRESSMAN DADDARIO: We have a civilian agency and we have a military agency, and we have got to take them and bind them together. I have suggested that we have, since the Air Force has been placed in charge of our military space program, someone who has the direct responsibility at an equal level with the director of NASA to utilize the full capacities of the Air Force together with the civilian agency to accomplish both military and civilian uses in space.

DR. WELSH: May I just add one point there? Time is the resource which is most scarce as far as our space program is concerned, and there are few things that are more time-consuming than to

build up and develop an entire new agency or to break down already established lines of authority. We have made an effort to avoid this change in the structure of the government by setting up and making something out of this Space Council to try to bring the policies together, and I don't believe we can afford to waste time to set up just one agency to handle all the programs.

CHAIRMAN GARDNER: We seem to be optimistic about our chances of beating the Russians to the moon. Yet they are the ones already in space. How do we hope to overcome their lead?

DR. WELSH: The first thing we plan to do is to go forward much more rapidly on large boosters —liquid and solid. We are also planning to put a lot more attention on the rendezvous technique which may give us a step-up in acceleration. I don't know that anybody has said specifically that we're going to beat the Russians to the moon, but I am sure we won't be able to beat them if we don't start trying now.

CHAIRMAN GARDNER: I don't think anyone here has represented that we're going to beat the Russians to the moon. I for one do not believe that the manner in which we are presently organized will permit us to do so. We are not making enough use of the proven resources in the Air Force in connection with our lunar program, in my opinion; and unless we do so we can't buy back this precious commodity of time that we need.

GENERAL SCHRIEVER: I have felt myself that we not only have the capability of catching up with the Soviets, but also the capability of getting ahead. After all, we have a nation that has a gross national product twice that of the Soviet Union. We have the resources. By that I mean the industry, the scientific, and the military. We have the know-how.

I personally have seen large programs undertaken and have seen them move forward very rapidly. From that point of view I have a great deal of confidence. The question is one of management. I have personally seen no indication on the part of the people that I have been dealing with in NASA at the top level that we aren't moving in the direction of creating the proper interface to work together closely in bringing all of the resources to bear, those that we have and those which are in NASA.

Remember, this program has been approved for only a relatively short time. It's a massive program. The plan for Cape Canaveral where the launchings will take place has been in every respect a joint planning effort between the Air Force and NASA at the working level. My commander there, General Davis, working with NASA, worked up a detailed plan for Cape Canaveral—just as an indication that we are working together in specific areas.

CONGRESSMAN DADDARIO: Enough monies have been appropriated by this Congress to do as much as we possibly can do at the moment to get this program on the road, to give it the kind of urgency it needs. There is no question in my mind that the Congress will in the succeeding years appropriate the additional funds that are necessary. I think you will find a space budget in the vicinity of $3.5 billion to $4 billion within the next couple of years.

CHAIRMAN GARDNER: Does the Air Force have even one approved man-in-space program today? If not, why not?

GENERAL SCHRIEVER: Dyna-Soar is a man-in-space program, and that is approved.

CHAIRMAN GARDNER: Is our policy that space is for peaceful purposes fooling anyone but the US public?

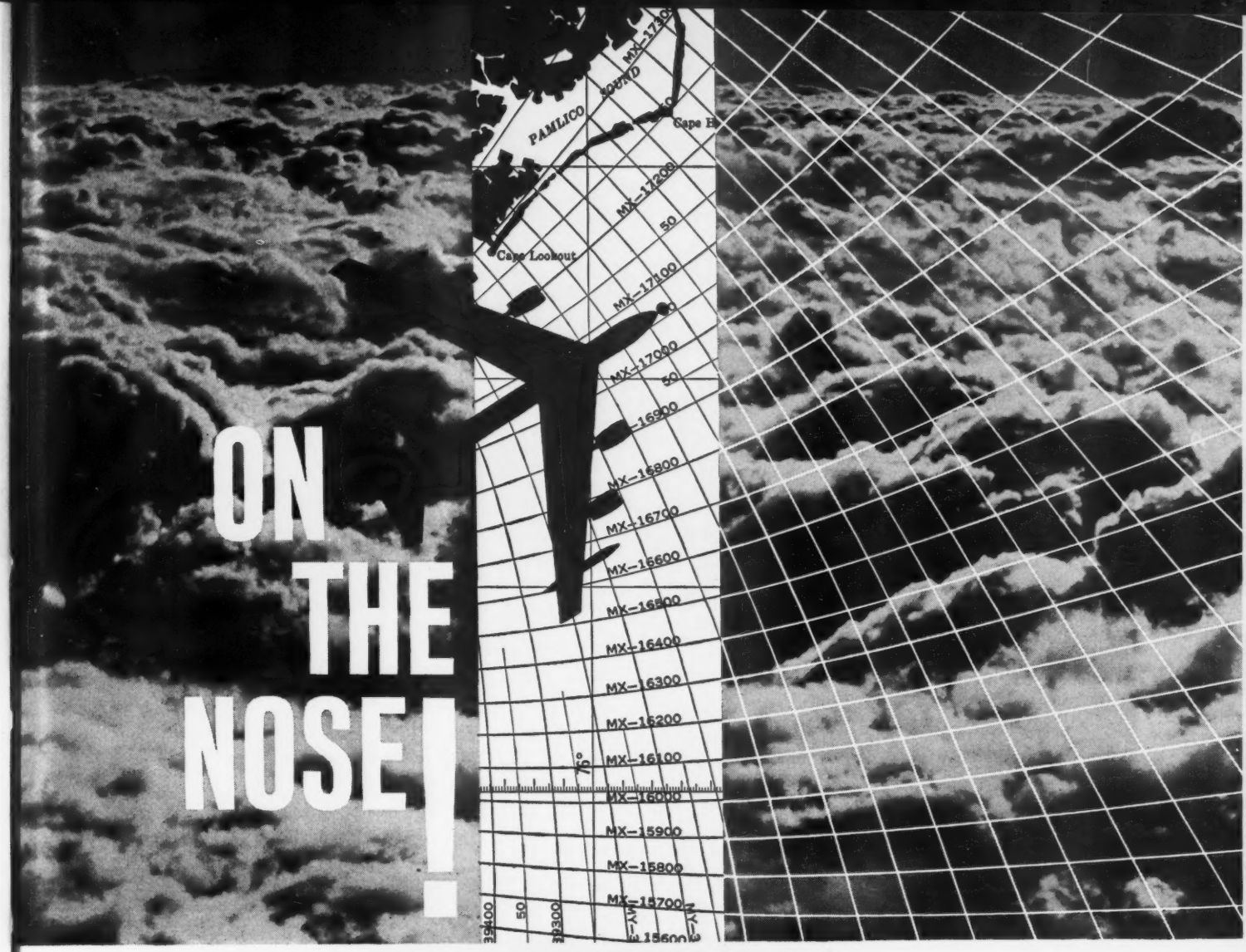
DR. WELSH: It certainly isn't our policy to fool the US public. I'm afraid there has been, however, a good deal of confusion as to just what the policy was until fairly recently, and it has been spelled out more clearly, I believe, by the President in recent months than it had been at any time before that.

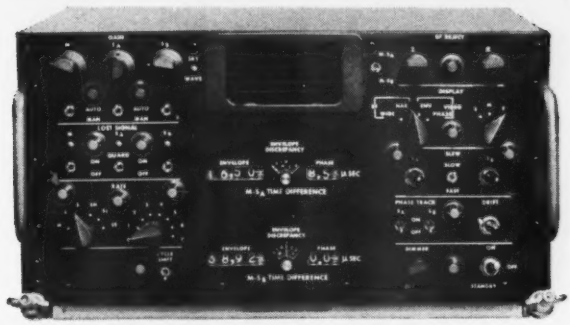
I think it depends on what you mean by peaceful uses. The way I defined it in my initial statement was that the entire activity of the Department of Defense is for peaceful purposes in the sense of their effort to maintain the peace; and if we don't maintain the peace we won't have any chance to fly to the moon or any place else.

CHAIRMAN GARDNER: Is the USAF being denied authority and money to go ahead in space in the way it wishes to do?

GENERAL SCHRIEVER: All of the programs that we have approved—and there is a very significant program under way in the field of warning, navigation, weather, observation, and so forth—are, in my opinion, funded to the extent necessary to push them forward as fast as technology will permit. What I have pointed out was that there needs to be further emphasis as we go down the line now in additional areas.

CHAIRMAN GARDNER: Is it more important to have a space program which is aimed at getting national prestige or is it better to concentrate on those programs having a direct bearing on military power?





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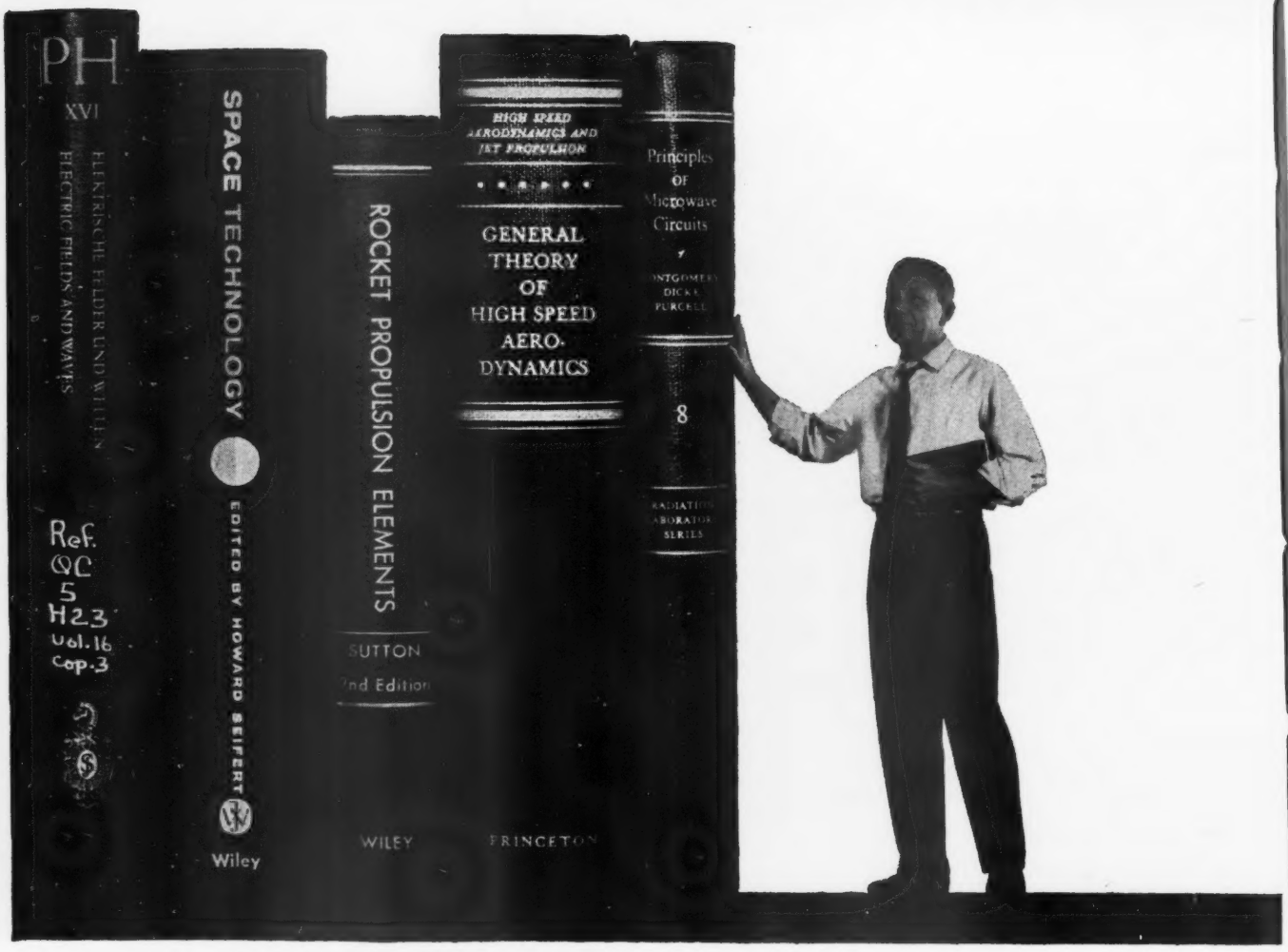

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DR. DORNBERGER: The reasons for conquering space are interrelated—propaganda, political prestige, military—they're all interrelated. And maybe a prestige success can change our political situation in the world. The Russian success caused a lot of neutrals to go into the Russian camp because they are afraid that what the Russians can do with their scientific achievement in space they could do with weapons, too.

Our first task should be to guarantee our survival and to prevent the Russians from getting supremacy in space. That, I think, is vital; and if the question ever comes up that we don't have enough money to do both I would spend my money on the military supremacy in space.

CHAIRMAN GARDNER: Military tradition has often delayed the introduction of new weapons. Is this happening in the space field?

DR. WELSH: I don't think there is any evidence that the attitude of the military is one of delay. As a matter of fact, as we attempted to build up this new space program that was presented to the Congress, the first place we sought advice was from outstanding gentlemen like General Schriever; and we got it. We got good advice, and the advice was to go ahead and to go ahead fast. I have seen no evidence that the military was acting as a lag in this program. As a matter of fact, they're part of the catalyst in it.

CHAIRMAN GARDNER: Is spending so much money on space justified when we consider the other pressing needs which we have right here on earth?

Cancer research is often mentioned in this connection. It would be nice to solve all of our earthly problems before we think about other problems. However, that isn't the way things are. The reality of life is that there is competition in the space field and there is opportunity there. The money we spend in space is not wasted. It will have large and regenerative civil fallouts for projects on earth.

Our society is rich enough to take the space adventure and must spend money on the military space problem and still solve most of our problems on earth, or at least work on those problems.

CONGRESSMAN DADDARIO: I think we already have received a great deal of benefit from the space program. We have, for example, developed a valve small enough to be used in the human heart. There have been developed batteries with the capacity and ability to be utilized in operations so that they can help the heart to pulsate where it otherwise would not. There has been developed in the area of mental illness, which is one of our most costly problems and one of the ones we will be faced with in years to come, the ability to look into the brain, to map it out, to find out how it affects us and how it is affected by those things we do from day to day.

Some scientists who have been working in this program have told me that if it were not for this help they could not do what they have done, and that in the last ten years they have learned more about the brain than they have in all of the previous history of study.

DR. WELSH: We didn't spend enough on cancer research before we ever had a space program, so that it isn't necessarily either/or; and it isn't that if we didn't spend the money on space we would spend it on cancer. We've got to do both and we can afford to do both.

GENERAL SCHRIEVER: I'd like to make several points. Number one: already in space (and it's not even four years old) we have civilian programs which industry is falling all over itself trying to get in on. For example, communications. There are other immediate civilian applications, such as weather and navigation; and this is in the very early stages of this great experiment of ours. So who can say what we'll have ten years from now in terms of things that make our life better right here on earth because of our space program?

The second point is that I don't quite understand why a nation that has a gross national product approaching $500 billion a year, at the same time has indeed a very large-scale unemployment problem. Many of our basic industries are not anywhere near full production.

I think that we have to really harness our economy. We are in an all-out competition with the Soviet Union. One of the strongest things that we have is our economy, and anyone who tells me that we can't afford $5 or $6 billion a year for space I just would have to disagree with.

CHAIRMAN GARDNER: I would like to close with the observation that today the Soviets are ahead of us in big boosters and are testing larger ones. They are ahead of us in man in space and we don't know what else they're ahead of us in. I don't find a great deal of comfort in the fact that we have performed a few notable scientific experiments in space and allege that we're ahead in space science. I believe all of us must work and work diligently if any military space program of any major sort is to get born.—END

Speaking of SPACE

WILLIAM LEAVITT
Associate Editor, SPACE DIGEST

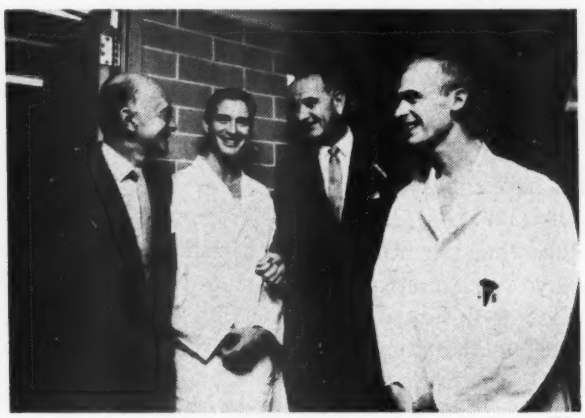
Vice-Presidential Visitation

It was sheer coincidence but not without symbolic significance that on October 4, fourth anniversary of the launching of the first Soviet Sputnik, Lyndon B. Johnson, Vice President of the United States and chairman of the National Aeronautics and Space Council, highest advisory-policy body on space matters in the Executive Branch, was trudging the dusty soil of Vandenberg AFB, Calif., on an inspection tour of launch complexes at the Western space base. From shy beginnings space has emerged under the aegis of a new Administration, as a vital, booming endeavor to which sizable funding and effort are to be devoted.

The Vice President was in the crowded middle of a three-day flying tour of Western space facilities that took him by presidential jet, Marine helicopter, motorcar, and foot to the National Aeronautics and Space Administration's Ames Research Center at Moffett Field, Calif.; The NASA Flight Research Center at Edwards AFB, Calif.; the California Institute of Technology's Jet Propulsion Laboratory, operated for NASA at Pasadena, Calif.; Vandenberg; and the Navy-operated Pacific Missile Range, headquartered at Point Mugu, Calif.; with a final stop at the Air Force's Aerospace Medical Center at Brooks AFB, Tex. (*See cut.*)

Accompanying press, this reporter among them, were hard put to keep up with the indefatigable Vice President, who from all indications en route approaches with deadly earnest his role as statutory chairman of the Space Council. He intends to make a number of additional visits to other space installations, civilian and military, across the country in future months, to familiarize himself with people and projects and to convey the President's personal interest in the national space effort.

The Vice President visualizes the space program, epitomized by the giant and complex moon-landing program, as an opportunity to push forward a



After emerging from seventeen-day stay in pure oxygen environment in Brooks AFB, Tex., space-cabin simulator, Lts. Craig V. Miller, second left, Melvin E. Pollard, right, were greeted by space-base-touring Vice President Johnson, Dr. Edward C. Welsh, Space Council executive secretary.

vitalization, economic and educational, of the entire country, to kindle new research capabilities in hitherto technologically fallow areas of the nation. He is confident that the funding momentum of the space program can be sustained in Congress.

He is especially concerned with the problem of personnel and wants to help create a climate of "fair shake" vis-à-vis industry in terms of salary and benefits for federal technical people working at centers across the US, although he acknowledges that perfect equalization is not possible. He believes that the sense of participation in a vast national project is the driving motivation that keeps government space-project people on the job, but he recognizes that, like their confreres in industry, they, too, have mortgages and youngsters.

The vital question of the military significance of space technology (*see "Space and National Security Symposium," pages 71 through 89*) is on the Vice President's mind, too, and he indicates that military input and consideration of security requirements are high on the space-planning agenda.

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There were touching—and frustrating—moments during Mr. Johnson's tour. At Ames Research Center, his first stop, he made a brief speech at a luncheon held in his honor, at which he said, in part:

"In Washington, it is all too easy a matter to conclude that the work is being done in the nation's capital. Actually . . . we know that a major share of it is being done right here by the dedicated scientists, technicians, and workers of America. . . . The road to future strength and future prosperity—and we hope to future peace—lies through . . . space. As the leader of the free world, the United States must travel that road confidently and as rapidly as possible."

To that, Ames's Director, Dr. S. J. DeFrance, quietly replied that in the forty years he had served at Ames this was the first time that a person of such rank as the Vice President had visited his facility. The warm reception Mr. Johnson received at all his stops underscored Dr. DeFrance's comment.

There was a painful moment at Edwards when the Vice President stood on a promontory to witness a static firing of the now-in-development F-1 million-pound-thrust single-chamber engine. Mr. Johnson waited, the countdown proceeded, and frustration happened. There was an ignition malfunction and the firing had to be put off. The Vice President took it cheerfully, but was visibly disappointed.

At each installation, after receiving briefings, he made sure to thank personally the briefer and to convey the President's best wishes. Perhaps the warmest scene of all was at Brooks AFB, where Mr. Johnson was given a demonstration of pressure-suit functions. At the conclusion of the demonstration, the subject, still totally enclosed in his garb, had his pressure-suited hand pumped vigorously by the Vice President, who at the same time uttered his appreciation for the demonstration. The subject, his head enclosed in a helmet, could not quite make out the actual words, but his smile through the clear plastic showed that he got the message.

The Vice President's concern with the personnel problem is shared by other planners. That the military is not the only branch of government with serious specialized technical personnel retention problems in the aerospace age was evident in conversations with space officials during the Vice Presidential flying tour.

It was pointed out that although starting rates for junior scientists and engineers are equitable in government vis-à-vis industry, at the five-year experience level real differences develop between the salaries NASA can pay and what industry will offer. To meet this problem, there are indications that NASA may go to a solution the military has leaned on: setting up a nonprofit corporation to help provide top-talent staffing at competitive-with-industry salary levels for the high-priority moon program and other space projects (*see also Mr. Witze's article on nonprofit corporations, beginning on page 54*). Other approaches to meet the personnel-salary problem may include requests to Congress for additional "supergrade" jobs at the civil space agency, plus some upgrading of personnel whose responsibilities and experience ordinarily would not entitle them to supergrade status or payment at the level of contract employees.

The personnel problem is a tough one, and as one expert has put it: "We've established priorities for materials and facilities and projects; somehow we've got to develop a system of priorities for people."

Space Capsules

The big news out of this year's INTERNATIONAL ASTRONAUTICAL FEDERATION meeting, held in Washington October 1-7, was the Soviet discussion of the "seasickness" in zero gravity of their second Cosmonaut, MAJ. GHERMAN TITOV, during his multiorbital trip in the Vostok II. There was a flurry of speculation that if Titov's disorientation during flight, which was attributed to reactions in that portion of the inner ear that ordinarily provides balance, was something beyond a purely personal reaction, much rethinking might be necessary on the part of American space planners on the question of providing artificial-gravity devices for future space vehicles.

There was a certain feeling of tenseness among the Russians at this year's meeting. Although they had a press conference scheduled at one point, it was rather suddenly canceled. On the final day of the meeting, they were promising to show a film of the flight of Major Titov, but at the last minute that was reported to have been held up in New York City at customs, and they showed instead an outrageously propagandistic movie about Gagarin, which contained portions contrasting, rather insultingly, the Gagarin feat with shots of Americans "trying to catch up with the Russians" with chimpanzees. Following the monkey sequence, they flashed on the famous press conference in Washington in 1959 at which the seven US Mercury Astronauts were introduced. The crowd applauded the Americans.

International *quid pro quo* came to the fore at

the IAF meeting, too. Because Americans are rarely allowed to attend noninternational Soviet meetings in the USSR, as opposed to international meetings held in Moscow, the Russians were not permitted to journey to the New York meeting of the American Rocket Society which followed the IAF meeting in the capital.

SPACE LAW was high on the IAF agenda this year, with much discussion of whether or not extraterrestrial bodies are susceptible to national claims. There was general agreement that the most desirable possibility would be at the internationalization of space with no establishment of national sovereignty on celestial bodies.

DONALD N. MICHAEL, now director of research for the newly established Peace Research Institute, gave an interesting paper on the problem of interpreting public attitudes toward space activities, from the point of view of a social psychologist. He warned that space planners should not confuse their own enthusiasm and dedication with wholehearted public acceptance of space efforts. "There is ample evidence from laboratory and field that man is conservative when it comes to changing his personal world view," he said. "Most people attend carefully to experiences which are immediately significant in their own everyday [lives]. . . . The experience of changing attitudes and values is an upsetting one that most people try to avoid. For the most part, most men will continue to look at the new horizon of space through old eyes—when they are not staring at some different horizon altogether. . . . For a long time . . . traditional interests will be not so much changed by space as space will be molded by them."

WILLIAM HINES's series of articles on "Operation Moon," the NASA program to land a manned expedition on our nearest neighbor before the end of the decade, which ran in the Washington *Star* recently, will be released as a booklet by the civil space agency. For information on availability, write to Public Information Office, National Aeronautics and Space Administration, Washington 25, D.C. . . . The revised edition of the House space committee's staff report, *The Practical Values of Space Exploration,* is now available. Write to the US Government Printing Office, Washington 25, D.C., for information on availability and cost. . . . If you live in the Pittsburgh area, you can expand your intellectual horizons and meet new friends at the same time by enrolling in the BUHL PLANETARIUM and INSTITUTE OF POPULAR SCIENCE's fall series of classes for adults, students eight to fourteen years old, and the high-school group. Courses are available in general science, modern mathematics, modern physics, junior astronautics, and telescope-making, among other items. Write for information to Edythe Hite, Buhl Planetarium, Federal and West Streets, Pittsburgh 12, Pa.

"Wake up! Wake up! We can't sit here night after night! This is the Space Age!!"

If AIR FORCE/SPACE DIGEST is never cited again in another publication, it will be no matter, for we have attained a happy ultimate. Our January 1961 issue article, "Comics, Common Law, and the Cosmos," by Mortimer D. Schwartz and John C. Hogan (which appeared originally in the University of Oklahoma's alumni magazine, *Sooner*), is cited in a delightful piece on the diabolical Professor Moriarty of Sherlock Holmesian fame in the *Baker Street Journal,* Volume 11, Number 3, New Series, 1961. The *Baker Street Journal* piece, by the same Mr. Hogan, recalls Professor Moriarty's fascination with interplanetary matters and a "lost" scientific tome by him on the cosmos which Holmes knew about. Moriarty knew the jig was up as far as London operations were concerned, and was not unmindful of the possibilities of "an outlaw colony, located on a lonely planet . . . where men 'wanted' by the law may hide out and where the interplanetary police may not enter."

As Mr. Hogan writes in the *Baker Street Journal,* "It is indeed a mark of credit to the shrewd genius of the 'illustrious Moriarty' that he foresaw with his 'puckered eyes' in the nineteenth century the launching of the sputniks and satellites, with opportunities for asteroidal crime when man inhabits planetary bodies in outer space.

"Rest assured, however," concludes Mr. Hogan (and we will), "that Holmes was familiar with the Professor's . . . plans . . . and that he would have trailed Moriarty into the deepest regions of outer space if that were necessary to prevent his crimes and torts."

Astro-elementary, my dear Watson.—END

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Here is a scattering of articles from recent issues, just to give you an idea of what you'll get:

The Coming Race for a Mach 3 Transport
by Senior Editor Claude Witze

USAF's Top Ten Priorities
by Gen. Thomas D. White, former C/S, USAF

Minimum Deterrence Is a Phony
John F. Loosbrock, Editor

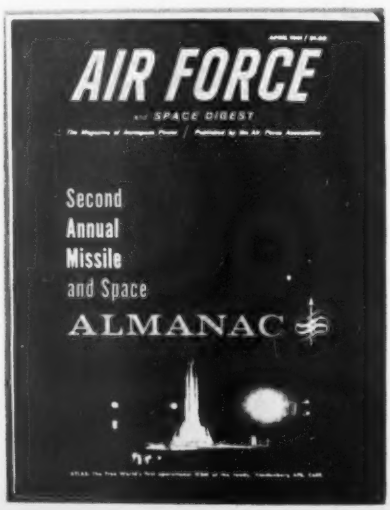
Automation . . . a Soviet View
by Soviet Scientist V. A. Travesnikov

The Space Arena: New Dimension for Prestige and Power
by Dr. Edward Teller, Nuclear Physicist

Intellectronics: Education's Newest Frontier
by Dr. Simon Ramo, Thompson Ramo Wooldridge, Inc.

Some Thoughts on Communications Satellites
by Edward R. Murrow, Director, US Information Agency

And twice each year, you get bonus-size copies of AIR FORCE/SPACE DIGEST—the annual Almanac and Space Almanac issues—each one jammed with facts about the USAF . . . its personnel . . . mission changes . . . weapon systems . . . command and procurement methods. Each issue is a valuable reference book, one you'll use all year, until the next one is out.



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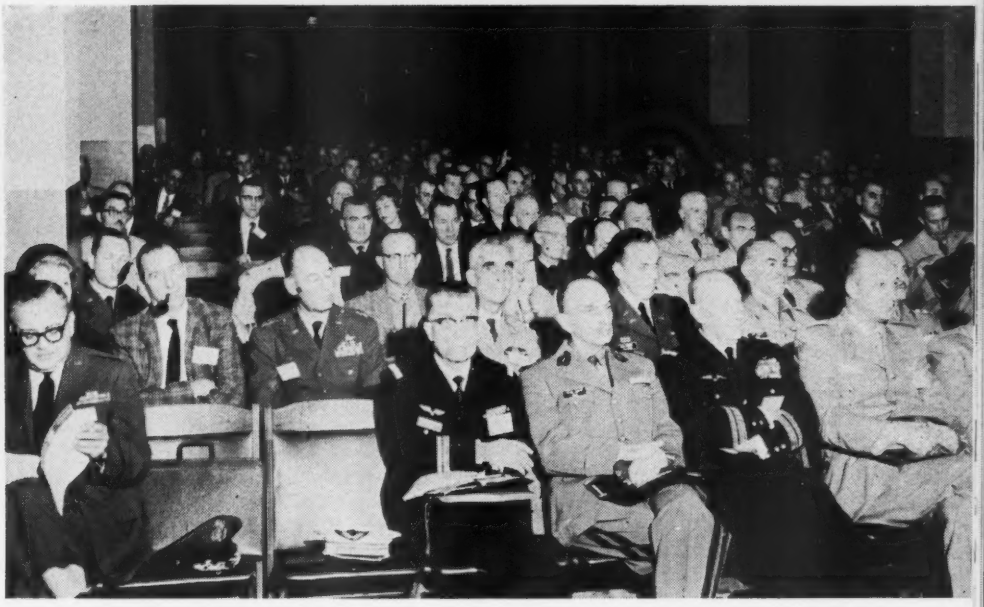
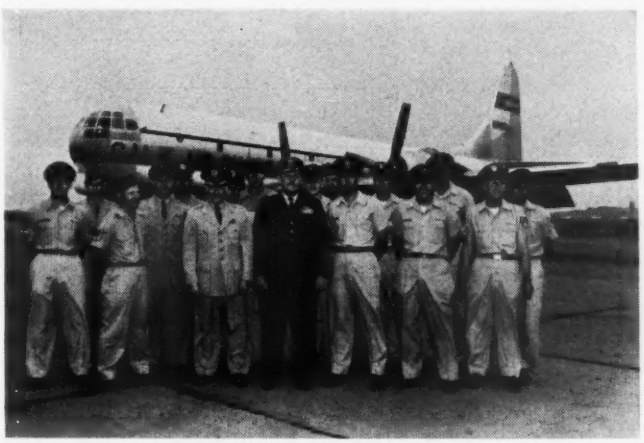
Reserve Forces Featured at AFA Convention

MATS commander Lt. Gen. Joe W. Kelly presents Ricks Trophy to Capt. Bob Reardon of winning C-97 in ANG event.



Group shot of audience at Reserve Forces Seminar, prime Reserve event at the AFA National Convention. Packed hall heard distinguished group of officers speak, answer questions on host of vital issues facing the Reserve Forces.



Maj. Gen. Winston P. Wilson, Air National Guard chief, with ANG Ricks competition participants at Philadelphia.

Respect and Retrospect

The key role of the **Air Reserve Forces** in bolstering US aerospace power drew major emphasis throughout sessions of **AFA's 1961 Convention** at Philadelphia from September 20 through 24—appropriately enough in view of the current Reserve and Guard callup.

Prime Reserve events at the Convention were the 1961 **Ricks aerial competition** and the **Reserve Forces Seminar.** The Reserve Forces also drew frequent comment in other presentations by Air Force leaders, educators, and industry executives.

An estimated **700 people** were in the audience at the **Seminar,** including military observers from several foreign countries. Retired USAF **Col. Jack Rambeau,** AFA's newly appointed director of military relations, opened the session.

Col. Rambeau was flanked by a panel of Reserve Forces leaders, headed by **John A. Lang, Jr.,** deputy for Reserve and ROTC affairs in the office of the Secretary of the Air Force. With him were **Maj. Gens. Robert E. L. Eaton,** assistant chief of staff for Reserve Forces; **Winston P. Wilson** of the Air Guard; and **Chester E. McCarty,** deputy for Air Force Reserve under General Eaton. Their assignment was to help answer questions from the floor.

Speakers included **Lt. Gen. William E. Hall,** making his last appearance before retiring as CONAC commander on September 30; **Lt. Gen. Joe W. Kelly,** Military Air Transport Service commander; **Lt. Gen. Robert M. Lee,** head of the Air Defense Command; **Maj. Gen. Stanley J. Donovan,** Tactical Air Command's deputy for operations, and **Maj. Gen. Harold R. Maddux,** CONAC's vice commander.

General Kelly reported on developments in MATS' Reserve Forces in the past year.

"I know the best service, probably, that I could perform here . . . would be to hammer down on problem areas, especially those that can be traced to the Reserve Forces themselves," General Kelly said. "But, to be completely honest, we have not yet met any significant problems of this type.

"We are in the third year of our government's effort to **expand the force available for global airlift in response to emergencies of any scope.** MATS, until quite recently, faced the prospect of carrying the full brunt of the critical hard-core airlift mission alone. **This situation has changed significantly within the year** . . . because of excellent response of our Air Reserve Forces."

Reporting for the **Air Defense Command,** General Lee noted that when the **Air Guard alert program** was con-

(Continued on following page)

Outgoing AFA President Thos. F. Stack presents outstanding Reserve unit trophy to Col. George H. Wilson of the 445th Troop Carrier Wing of Dobbins AFB, Ga., at the Seminar.

Trophy for outstanding Air Guard unit goes to Maj. Eugene Royer for the 163d Tactical Fighter Squadron of Fort Wayne, Ind. Guard and Reserve units were repeat winners.

Mr. Stack presents Citation of Honor to Maj. Gen. Robert E. L. Eaton, ACS/ Reserve Forces, at Reserve Seminar.

Citation also went to widow of ANG Brig. Gen. Barnie McEntire, who was killed in jet crash earlier in year.

Similar award was presented to Cindee McCallister, widow of ANG Lt. Col. Dave McCallister, victim of a jet mishap.

ceived in July 1954 it was intended only to provide "realistic training." But now, he said, it is an Air Defense Command requirement, not just a training expediency.

"The **Air National Guard** is considered to be an integral part of ADC, and it is our intent to provide guidance, assistance, and support—insofar as it is possible—with little differentiation between ANG and active ADC units."

TAC's General Donovan, discussing **"strengths and weaknesses" of the Reserve Forces program,** asserted that in the past the active establishment has been "guilty of arming Reservists with inadequate tools and training them with outmoded ideas."

"One thing we have learned," he said, "is that you cannot figuratively pull men off the street, cram them into uniforms, shove them into a combat outfit, and expect them to perform like professionals."

As the **major user of both Guard and Reserve units,** TAC has taken a "hard look" at the Reserve situation, General Donovan declared. "Because TAC's fundamental tasks are diversified and worldwide, **we must exert a major effort** in providing our assigned Reserve Forces with the best we have to offer. . . ."

General Maddux commented on progress being made in CONAC's recovery program.

In the groups and squadrons presently being organized, there are some **14,000 officers and airmen** assigned against a total authorization of 33,584 during the next two years of phase-in operations.

He listed certain measures needed to make the recovery program a success.

The first, he said, is to get **forty-eight paid drills for recovery personnel** instead of the **twenty-four now authorized.** Also needed, General Maddux said, are "many more" drill pay positions.

Resolutions supporting forty-eight paid drills and additional drill pay spaces were voted by **AFA delegates,** incidentally, as reported below.

Above all, General Maddux said, there must be a vigorous, concerted effort to recruit airmen, going beyond those who had been engaged in center training. He pointed out that many airmen who were not attracted to individual training might readily **be interested in the recovery mission.**

"Recovery units are in the first line of the Air Force's deterrent strength," General Maddux declared. "This is a **program which simply must succeed,** whatever the cost in time, money, and effort."

But it was General Hall, speaking last in the session, who made this Seminar one that will be long remembered,

(Continued on page 101)

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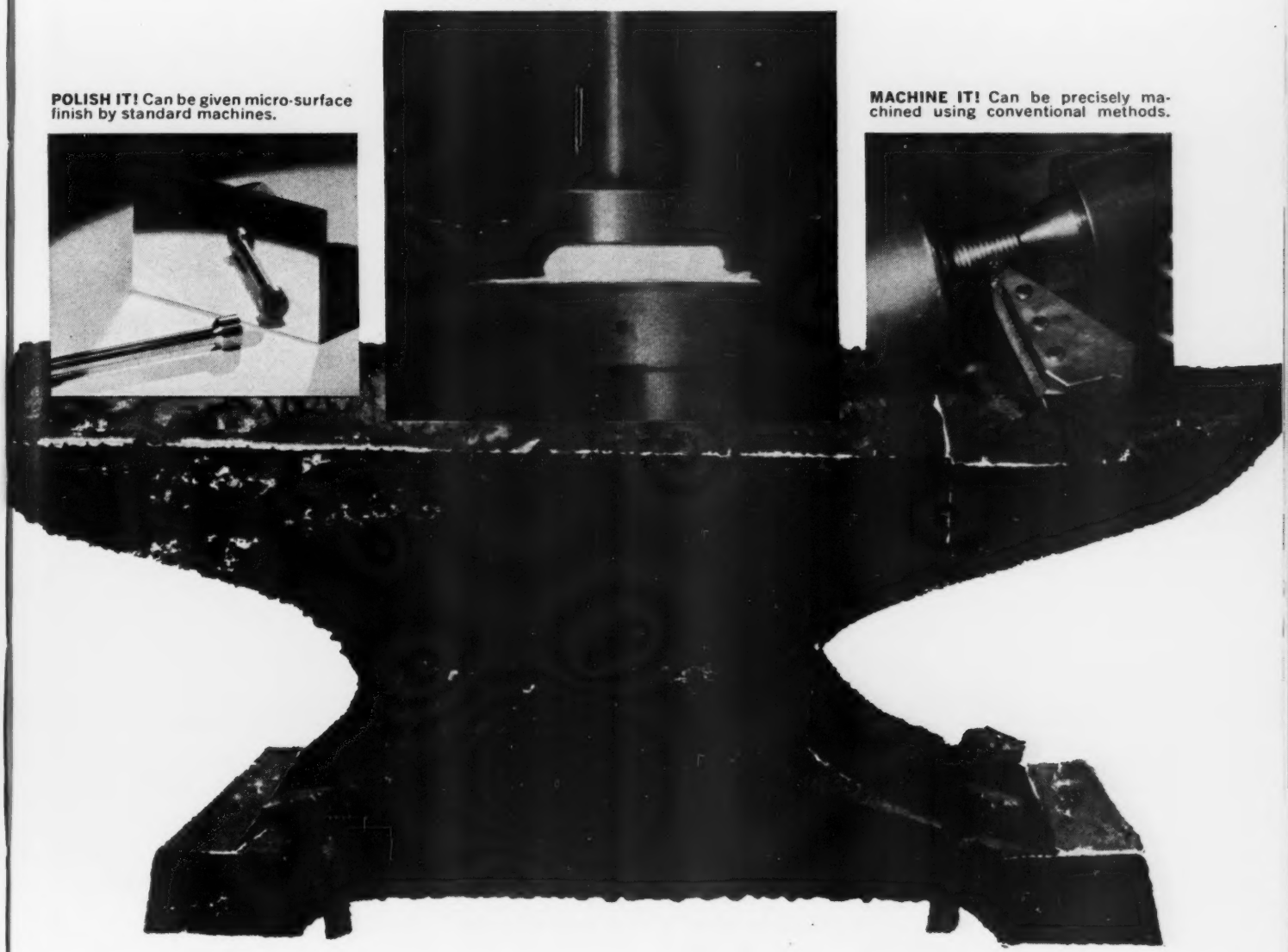

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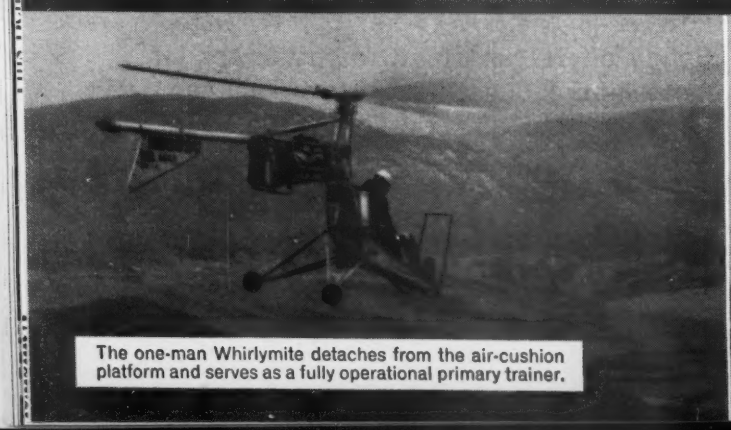

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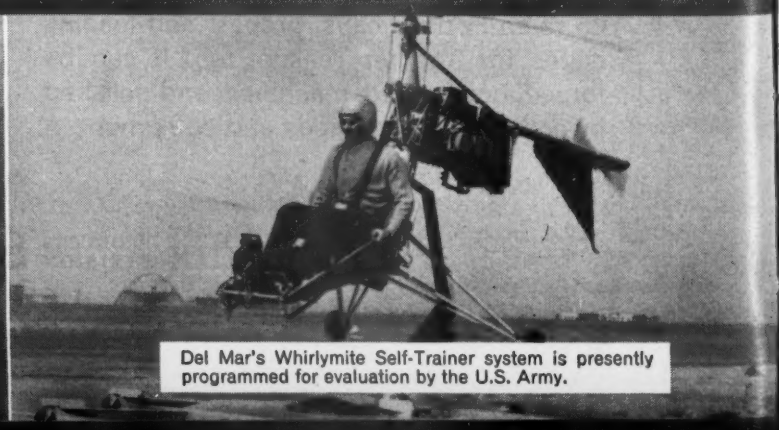

Del Mar's Whirlymite Self-Trainer system is presently programmed for evaluation by the U.S. Army.

as he delivered his valedictory to **thirty years' service**—the last eleven with the Reserve Forces.

In this, his last major appearance before his retirement at **Robins AFB, Ga.,** on September 30, General Hall said he has "long advocated" that the Air Force assign a missile role to the Reserve Forces.

He reported that morale problems exist among **active personnel assigned to hardened missile sites** because of their remote location and relative inactivity.

"It may prove out that these sites can be effectively manned by Reservists. . . . These people would be living with their own families, in their own homes, in their own towns. The cost of such manning would be only a fraction of that otherwise involved."

General Hall, as he phrased it, "indulged in a bit of retrospect" as he reviewed his past eleven years with the Reserve Forces, first as **Fourth Air Force commander,** then as **assistant chief of staff for Reserve Forces** in the Pentagon and, since 1957, as **CONAC commander.**

Lt. Gen. William E. Hall, now retired as commander of the Continental Air Command, speaks at Convention's Reserve Forces Seminar. At his left is retired Col. Jackson V. Rambeau, AFA's new director of military relations.

He took command of the Fourth Air Force in January 1951, when the Korean War was six months old. "Militarily it was a period of confusion and cross-purposes," he said. "Insofar as recall of the **Air Force Reserve** and **Air National Guard** was concerned, the entire procedure might well have been known as **Operation Scramble.**"

Despite initial problems, he reminded his audience, **126,000 Reservists** and **46,000 Guardsmen** eventually served with the Air Force in the Korean War.

"To the extent that I have been able to contribute to the program," General Hall continued, "it is most gratifying to me to see the vast improvement that has taken place in the Reserve Forces as we again confront a Communist threat. . . .

"The **enhanced stature of the Air Reserve Forces** has been brought about mainly, of course, by a relatively new and encouraging attitude on the part of the **Air Staff.** Better USAF war planning has played its role in the buildup, as has the planning of CONAC. I would be remiss, however, if I failed to mention the great influence exerted by the **Air Force Association and its members.** Support of Reserve aims and programs by AFA is a vital element in maintaining a healthy posture in the Reserve Forces."

"All in all," he concluded, "I foresee a mounting importance for the Air Reserve Forces in the critical years to come and am confident that their **officers and airmen will meet their responsibilities with distinction.**"

Late Rep. Overton Brooks (D.-La.), who died in September. Congressman Brooks was known as "Mr. Reserve" for his long-standing interest and efforts in the Reserve area. He also headed House space committee from 1959 to his death.

Reserve Honors

A pair of two-time winners were among Reserve Forces units and individuals receiving awards at the Convention.

Winner of AFA's outstanding unit trophy for the Air Force Reserve was the **445th Troop Carrier (Dixie) Wing** of Dobbins AFB, Ga., commanded by **Col. George H. Wilson.**

Outstanding Air Guard unit was the **163d Tactical Fighter Squadron** of Fort Wayne, Ind., commanded by **Maj. Eugene D. Royer.**

For the first time in the history of either component, both units were repeat winners, having won the trophies also in 1960.

Colonel Wilson and the 1,500 men of his wing may be making a habit of winning, but Major Royer promised he wouldn't be back next year. His squadron entered on active duty with TAC on October 1.

They received the trophies at the **Reserve Forces Seminar** from **AFA President Tom Stack.**

Mr. Stack also presented a citation of honor to **Maj. Gen. Robert E. L. Eaton,** assistant chief of staff for Reserve Forces, for "long-standing contributions to aerospace power."

Flanked by **Lt. Gen. Joe W. Kelly,** MATS commander, and **Maj. Gen. Winston P. Wilson,** Air Guard chief, Mr. Stack made the formal presentation of the **Ricks Trophy for 1961** to **Capt. Robert Reardon** and his **Air Guard C-97 crew** representing the **195th Air Transport Squadron,** Van Nuys, Calif.

Also honored at the Convention were the two outstanding airmen of the Reserve Forces, **MSgt. Ronald B. McDonald** of the 9076th Air Reserve Group, Los Angeles, Calif., and **MSgt. Raymond L. Shannon** of the Guard's 111th Fighter Group, Houston, Tex.

The **132d Air Defense Group** of Des Moines, Iowa, won the **Winston P. Wilson Trophy,** awarded annually by the **Night Fighters Association** to the top Air Guard air defense unit. It was accepted by **Col. Robert M. Moorehead,** Group commander, from **Col. Fred G. Hook** of the National Guard Bureau, representing General Wilson.

AFA also presented posthumous awards honoring **Brig. Gen. Barnie B. McEntire, Jr.,** and **Lt. Col. David F. Mc-**

(Continued on following page)

Callister, members of AFA's Air Guard Council, who died in separate aircraft accidents last spring. **Brig. Gen. William F. Spruance,** also an Air Guard Council member who was riding with Colonel McCallister, is still hospitalized.

Mrs. McEntire accepted her husband's award from Tom Stack at the Reserve Forces Seminar. Mrs. McCallister received the award at the Reunion Brunch from **Milton Caniff,** whose famous cartoon character, **Hotshot Charlie,** was based on **"Snapper"McCallister's** early flying career.

Longest Check Ride in AF History

There may never be another Ricks Trophy competition quite like the 1961 event.

Competing for the trophy were **six eight-man C-97 crews** in a MATS transpacific cargo training mission.

Before the winner was determined, they had flown some 14,000 miles from **Travis AFB, Calif.,** to **Tokyo** via **Hawaii** and **Wake Island** and back over a seven-day period. For good measure, the two finalists added a cross-country run to Philadelphia two days later to signal the opening of AFA's 1961 Convention.

From the moment crews reported to operations to begin preflight planning, until engines were shut down on the ramp after each leg, four MATS umpires checked every aspect of each crew's work.

It was, in the words of General Kelly, MATS commander, **"the longest check ride in Air Force history."**

To add to the crews' troubles, they had to contend with three windy females en route. **Hurricane Carla** was churning the midwest air when they departed home stations for Travis. At Tokyo, **Typhoon Nancy** sent them scurrying out of Tachikawa twelve hours ahead of schedule. And the two finalists reached Philadelphia between gusts from **Hurricane Esther.**

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Emerging on top after this ordeal was the crew of the **195th Air Transport Squadron** of Van Nuys, Calif., led by **Capt. Robert Reardon,** an insurance salesman. The 195th scored 23,215 points out of a possible 30,000, to beat out the **139th** of Schenectady, N. Y., by less than 700 points.

Third place went to the **133d Squadron,** Manchester, N. H., fourth to the **125th** of Tulsa, Okla. The **109th,** Minneapolis, Minn., was fifth, and the **115th,** also of Van Nuys, was sixth.

The 1961 Ricks event was unique in that it was the first time in the event's eight-year history that multiengined aircraft and multiman crews participated.

Captain Reardon accepted the **Ricks Trophy** from General Kelly at AFA's Reserve Forces Seminar.

In turn, General Kelly accepted all six squadrons represented in the event on October 1 when they went on active duty with MATS.

Resolutions on the Reserves

Of the **twenty-four resolutions** passed by AFA Convention delegates, seven directly concern the Reserve Forces.

- Recognizing the "personal and financial sacrifice" being borne by members of the Reserve Forces called up in the **Berlin crisis,** delegates urged the President and Congress to supplement the "woefully inadequate" **Soldiers and Sailors Relief Act** with additional legislation to "allow the retention of their homes, property, and adequate support of their dependents."
- Another resolution insisted that Reserve recovery units and base support units be authorized **forty-eight paid drills per year.**
- Noting that there is no single group to which active and Reserve airmen can turn for proper representation, delegates approved establishment of an **"Airmen's Council"** as a standing AFA committee.
- Pointing out that **rental and subsistence allowances** for Reserve airmen are lower than for active-duty airmen, delegates directed AFA to **press for equal allowances.**
- Delegates also reaffirmed AFA support for the **airmen retired pay equalization bill,** under which active-duty airmen would count enlisted service in Reserve Forces in computing their retired pay.
- In approving a resolution favoring passage of **permanent flight pay accrual legislation,** delegates urged that the bill be amended to include rated officers of the Reserve Forces on flying status.
- Delegates also called upon AFA to develop and implement **a program to make full use of Reservists who are AFA members in improving public understanding of the Air Force Reserve Forces and aerospace requirements.**

More Birds for TAC; Blake Promoted

Three Air Guard **F-104 Starfighter** groups go on active duty with the **Tactical Air Command** on November 1. The **Secretary of Defense** announced on October 9 that they were being called up. They are the **134th,** Knoxville, Tenn., **161st,** Phoenix, Ariz., and the **169th,** Columbia, S. C.

At the time of **Secretary McNamara's** announcement, the three groups had a total strength of 2,250 officers and airmen and sixty-five aircraft.

The F-104 groups had been assigned to Air Defense Command and were **performing twenty-four-hour runway alert** prior to the Secretary's announcement.

Lt. Gen. Gordon Blake was promoted from major general on October 1 when he assumed command of the **Continental Air Command,** succeeding General Hall.—END

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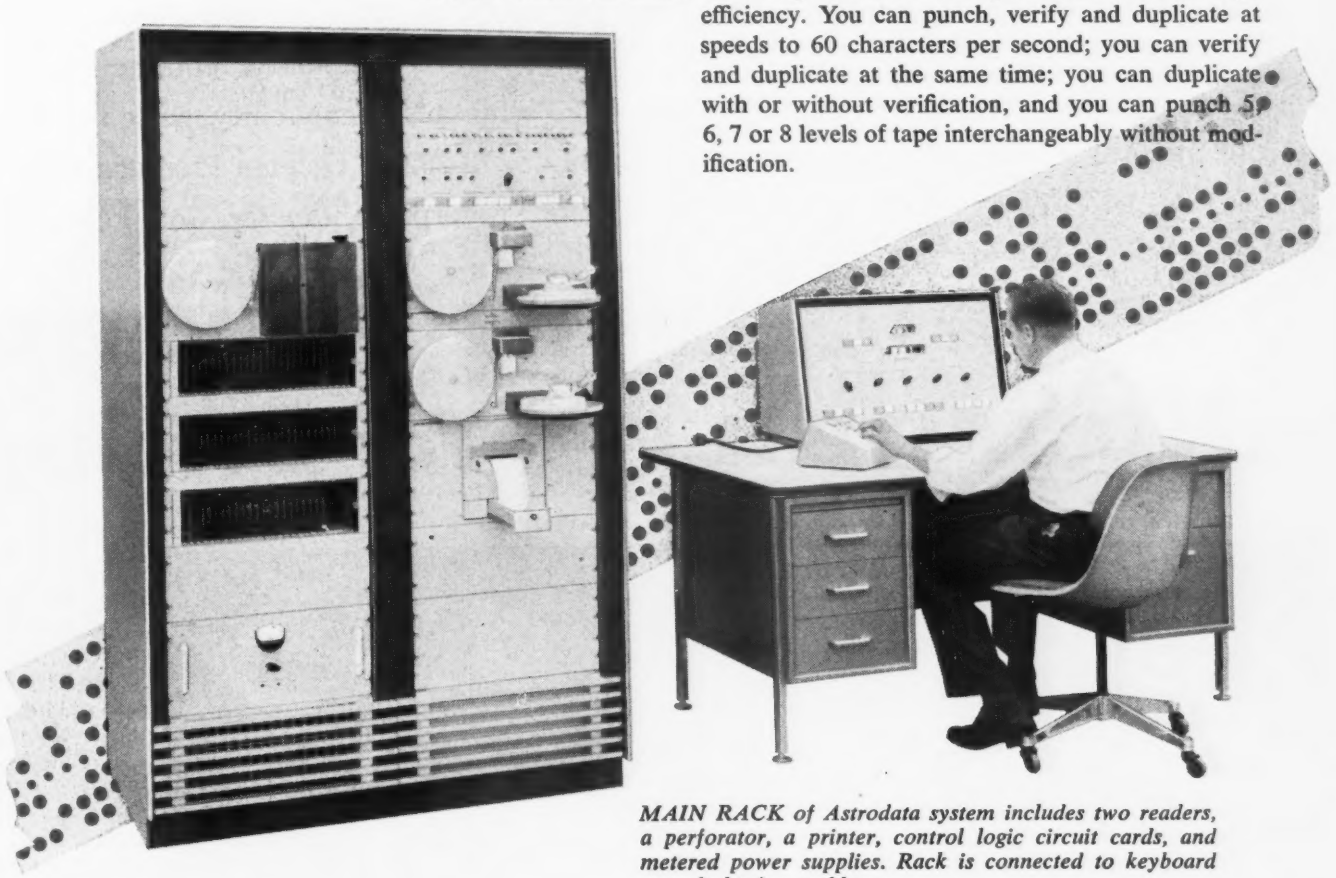
ASTRODATA's new automatic tape preparation system prepares sets of tapes encoded for AN/GJQ-9 missile checkout faster than any other equipment available. Tape feed is unidirectional in the Astrodata system—an exclusive feature which eliminates rewinding and allows multiple duplication with high efficiency. You can punch, verify and duplicate at speeds to 60 characters per second; you can verify and duplicate at the same time; you can duplicate with or without verification, and you can punch 5, 6, 7 or 8 levels of tape interchangeably without modification.



MAIN RACK of Astrodata system includes two readers, a perforator, a printer, control logic circuit cards, and metered power supplies. Rack is connected to keyboard console by four cables.

Prepares Perfect Tapes You will find it difficult to prepare anything but perfect tapes with Astrodata's system. It automatically detects both its own errors and operator errors and will not function if you hit the wrong tape characters on the keyboard. The system is performance-proven; all components are of established reliability.

What the System Does The Astrodata system perforates paper, plastic or foil tape from a keyboard which includes editing features. The system takes the completed tape, duplicates it, then "reads" or verifies the duplicates. During tape perforation, decoded characters are displayed visually and also printed out at 4 lines per second. Test numbers, errors and bit patterns in each reader are also displayed.

Versatile Operation Astrodata's system will search for a selected test number and stop at the beginning or end of the selected test. While searching, the system will perforate/print up to the beginning or end of the selected test. It will search for a selected test and after finding it will perforate/print that test, or perforate/print after that test. With minor modifications you can use this system for any automatic checkout program.

Accepts Inputs from Other Devices Circuits are provided so you can perforate/print/display tape information from such external sources as buffers, magnetic tape units, computers, etc.

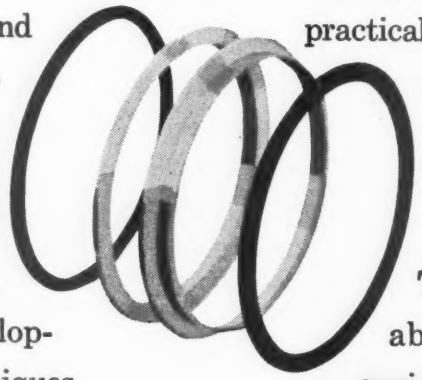
More Data Available For descriptive literature, please write to Astrodata, Inc., 240 E. Palais Rd., Anaheim, Calif.

ASTRODATA INC.

Successors to Epsco-West

ANAHEIM, CALIFORNIA

Problem: Sealing of heavy-vehicle track components. *Needed:* A seal to keep lubricant in, dirt, sand, grit and water out. *Produced:* A metal-to-metal, floating ring seal by Caterpillar. The result of basic research in metals, rubber compounds, and lubricants—plus development of new tooling techniques.



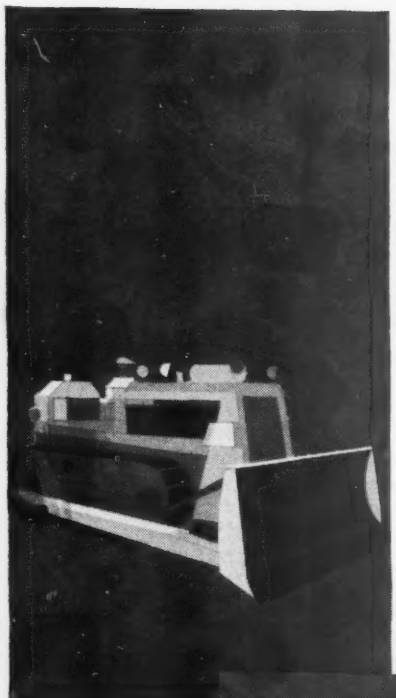
This advance in sealing design permits use of more effective lubricants and eliminates expensive day-to-day maintenance.

Such developments as this typify Caterpillar capabilities in producing sound, practical solutions for mobility needs.

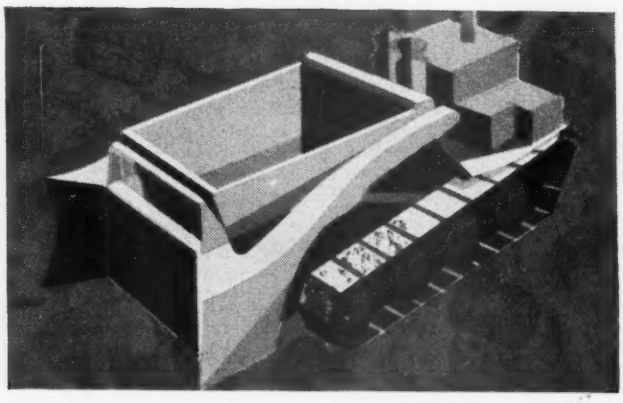
As a leading producer of heavy equipment, Caterpillar has outstanding resources in research, engineering and manufacturing. This experience and talent are available to you to meet your vehicle, engine, or component requirements.

For details of capability, write for Bulletin No. 40-20265. Defense Products Department, Caterpillar Tractor Co., Peoria, Ill.

CAPABILITY IN POWER AND MOBILITY *for defense*

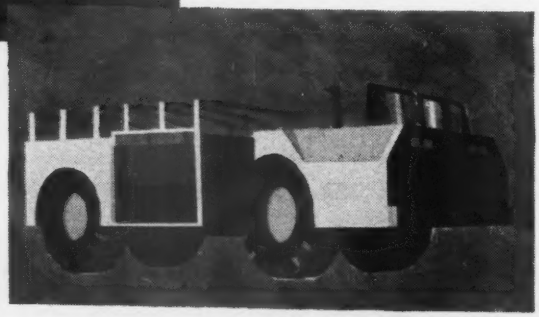


Air-droppable Tractor Bulldozer



Universal Engineer Construction Machine (under development)

8-ton GOER (under development)



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RESEARCH • DEVELOPMENT • MANUFACTURING FOR DEFENSE

'61 Convention Called 'Most Successful'

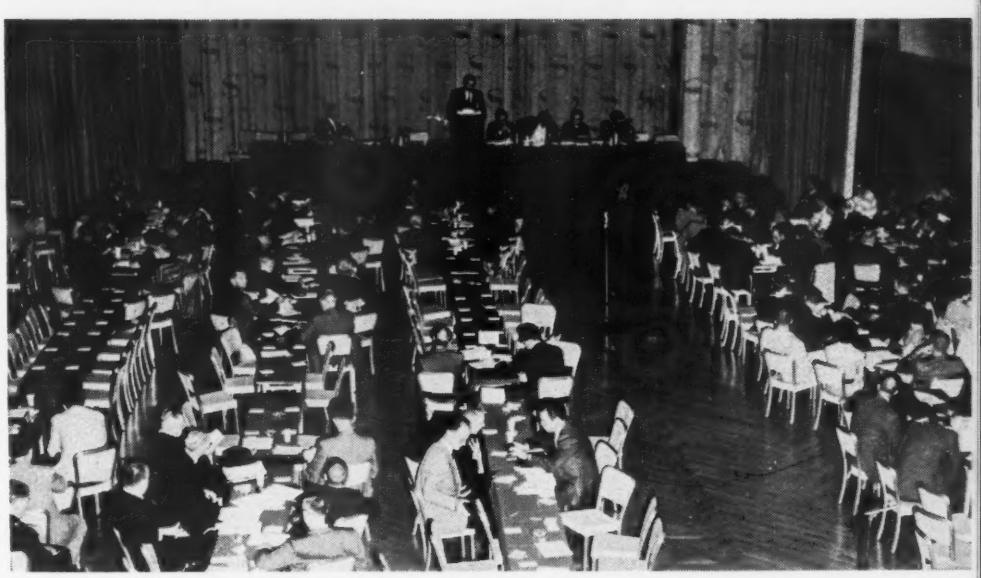
By Gus Duda

THE AFA National Convention at Philadelphia from September 20 through 24 was the most successful in Association history. AFA has come a long way since the first Convention, held at **Columbus, Ohio,** in 1946.

Joe Foss was elected president of AFA for the coming year by Convention delegates. **Thos. F. Stack,** outgoing president, become board chairman succeeding former President **Howard T. Markey. George Hardy** remained Association secretary and **Jack Gross** treasurer.

Thirty-two awards were presented at the Convention to AFA leaders and units for outstanding efforts during the past year. Top recognition went to the **Chico, Calif., Squadron** and to **Robert P. Stewart,** Roy, Utah, who were presented, respectively, the Presidential Trophies as AFA's "Squadron of the Year" and "Man of the Year." **Sankey M. Hall, Jr.,** an officer of the Chico Squadron, accepted for the unit.

Arthur C. Storz, founder of the Omaha, Neb., Squadron, a member of the board of directors for several years, and an outstanding leader for the past seven years, was the recipient of a solid gold card signifying his receipt of **Life Membership Number 3.** Previously elected to this unique category were **Gill Robb Wilson** and **Jimmy Doolittle.**



Due to the unusually large number of resolutions to be considered, the delegates held an additional business session. This is how it looked on Friday.

Howard Markey, retiring chairman of the board, received an illuminated scroll in appreciation of his services as vice president, president, and board chairman. As his last act prior to retiring as chairman, Markey addressed the **Arnold Air Society** luncheon at the Bellevue-Stratford Hotel and received a resounding ovation.

Exceptional Service Plaques were presented to four units and seven individuals. Recipients included the **Pittsburgh, Pa., Squadron; Union-Morris, N. J., Squadron; Squadrons of the Utah Wing;** and **Mobile, Ala., Squadron. David F. McCallister,** Swarthmore, Pa., and **Barnie McEntire, Jr.,** Columbia, S. C., both killed during the year in tragic aircraft accidents, were recipients of posthumous awards. Their widows accepted plaques for them. Others receiving individual Exceptional Service Plaques included **Charles O. Morgan, Jr.,** San Francisco; **James C. Snapp, Jr.,** La

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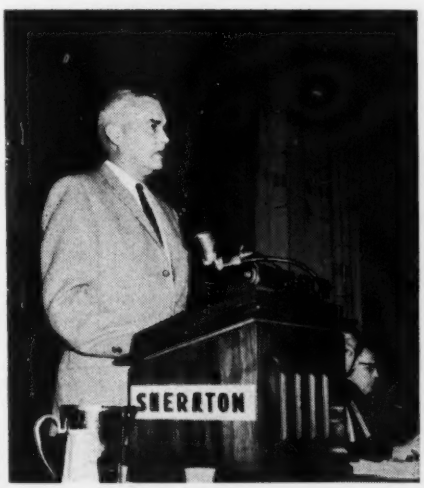


Carson Sheetz, California Commander, delivers report of Credentials Committee to Thursday business session.

Philadelphia's Mayor Richardson Dilworth gave the Convention a warm welcome at opening of the first business session. Bob Duffy *(see text)*, President Tom Stack, Rev. William Laird, and Board Chairman Howard Markey may also be seen above.

The old and the new. Joseph J. Foss, left, takes over as president of AFA from Thos. F. Stack. Photo was taken during Annual Awards Dinner.

Mesa, Calif.; **William W. Spruance,** Centreville, Del.; **James M. Trail,** Boise, Idaho; and **Donald J. Strait,** Bedminster, N. J. All are recipients of previous AFA awards.

Recognized for the first time with national awards were **Carl C. Alford,** Glendale, Calif.; **William Bromirski,** Jersey City, N. J.; **Vito J. Castellano,** Armonk, N. Y.; **William P. Gilson,** Sacramento, Calif.; **Willard Hawkins,** Little Rock, Ark.; **Dale J. Hendry,** Nampa, Idaho; **Joseph C. Jacobs,** Bountiful, Utah; **Maxwell A. Kriendler,** New York, N. Y.; **Ronald B. McDonald,** San Pedro, Calif.; **M. L. McLaughlin,** Dallas, Tex.; **James H. McPartlin,** Kansas City, Mo.; **John B. Montgomery,** Murray Hill, N. J.; **Italo Quinto,** Stirling, N. J.; **Roy T. Sessums,** New Orleans, La.; and **Stephen C. Yednock,** Harrisburg, Pa.

Citations, attesting to their excellent efforts leading up to the Convention, were presented to **Robert C. Duffy,** Philadelphia, commander of the Philadelphia Squadron, who served so well as chairman of the Convention committees; and to **Col. Thomas E. Gurnett,** commander, Olmsted AFB, Middletown, Pa. In addition to his duties on behalf of the 1961 Convention, Colonel Gurnett has also long been a staunch supporter of AFA activities in Pennsylvania, and particularly in Harrisburg.

Organizational resolutions approved by Convention delegates were these:

- Associate members of AFA, after three years of membership, may be extended the right to hold office in squadrons and flights. Previously only active members have been able to hold office.
- The former ceiling on wing allocations, $600 per year, was removed.
- Regional vice presidents may now receive an annual expense allocation of $1,000. Former allocation maximum: $600 per year.
- Hawaii, and the other areas formerly under the **Pacific Ocean Region,** are now part of the **Far West Region.** A special committee is to be appointed by the president to consider realignment of other AFA Regions in light of changing conditions.
- An assistant to the organization director is requested by the Convention, to further assist community efforts by AFA units.
- **Angel Flight members,** female auxiliary to the Arnold Air Society, are eligible for AFA Cadet Membership.

Twelve new names were added to AFA's board of directors for 1961-62, and one—**William P. Gilson**—moved from the Far West vice presidency to a position as national director. This means a total board membership of

(Continued on page 109)

AIR FORCE ASSOCIATION'S NEW LEADERS

SECRETARY
***George D. Hardy**
College Park, Md.

PRESIDENT
Joseph J. Foss
Sioux Falls, S. D.

TREASURER
***Jack B. Gross**
Harrisburg, Pa.

REGIONAL VICE PRESIDENTS

New England Region *G. Wayne Gibbs*	**Central East Region** **Joseph L. Hodges*	**Midwest Region** **Chess F. Pizac*	**Rocky Mountain Region** **Karl W. Caldwell*
Northeast Region **Frederick W. Monsees*	**South Central Region** **Will O. Ross*	**Northwest Region** **William D. Bozman*	**Far West Region** *John L. Beringer, Jr.*
Southwest Region **M. L. McLaughlin*	**Great Lakes Region** *Harold G. Carson*	**Southeast Region** *Alex G. Morphonios*	

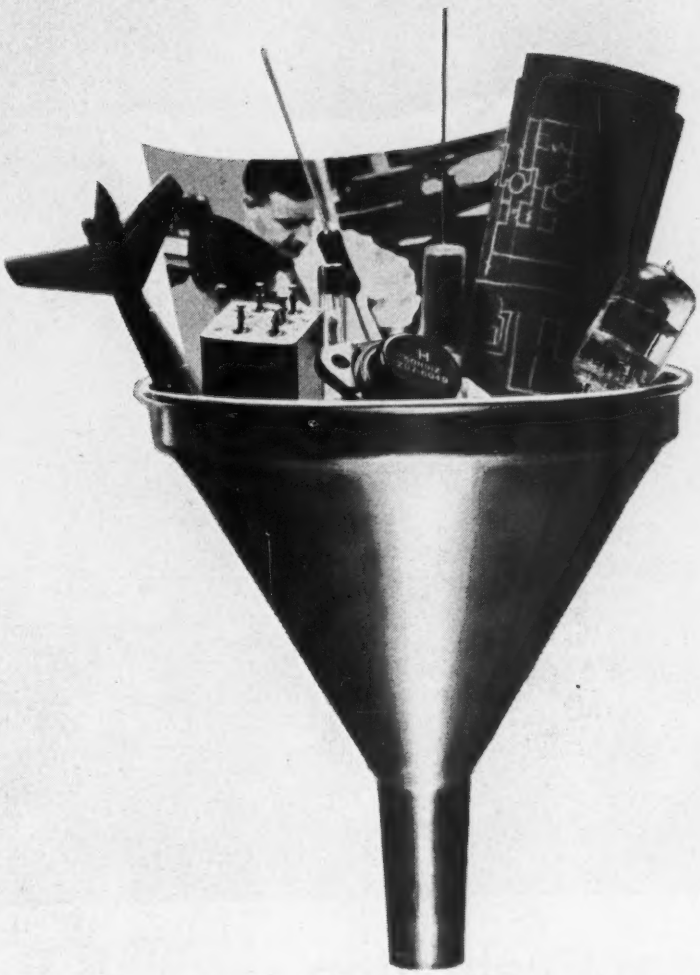
NATIONAL DIRECTORS

Chairman of the Board—Thos. F. Stack, San Francisco, Calif.

****John R. Alison** *Hawthorne, Calif.*	**Arthur Godfrey** *New York, N. Y.*	***Carl J. Long** *Pittsburgh, Pa.*	***G. Barney Rawlings** *Las Vegas, Nev.*	****Carl A. Spaatz** *Chevy Chase, Md.*
Charles L. Collins *Westford, Mass.*	****John P. Henebry** *Chicago, Ill.*	**W. Randolph Lovelace II** *Albuquerque, N. M.*	**Chester A. Richardson** *Pittsburgh, Pa.*	***Arthur C. Storz** *Omaha, Neb.*
***M. Lee Cordell** *River Forest, Ill.*	****Robert S. Johnson** *Farmingdale, N. Y.*	****Howard T. Markey** *Chicago, Ill.*	****Julian B. Rosenthal** *New York, N. Y.*	****Harold C. Stuart** *Tulsa, Okla.*
****Edward P. Curtis** *Rochester, N. Y.*	****Arthur F. Kelly** *Los Angeles, Calif.*	***J. B. Montgomery** *Murray Hill, N. J.*	****Peter J. Schenk** *Arlington, Va.*	****James M. Trail** *Boise, Idaho*
****James H. Doolittle** *Los Angeles, Calif.*	****George C. Kenney** *New York, N. Y.*	**Msgr. William F. Mullally** *St. Louis, Mo.*	***Roy T. Sessums** *New Orleans, La.*	***Alden A. West** *DeWitt, N. Y.*
James H. Douglas *Chicago, Ill.*	**Maxwell A. Kriendler** *New York, N. Y.*	***O. Donald Olson** *Colorado Springs, Colo.*	****C. R. Smith** *New York, N. Y.*	**Thomas D. White** *Washington, D. C.*
William P. Gilson *Sacramento, Calif.*	****Thomas G. Lanphier, Jr.** *Chicago, Ill.*		***James C. Snapp, Jr** *La Mesa, Calif.*	****Gill Robb Wilson** *LaVerne, Calif.*

*Incumbent

**Permanent Member



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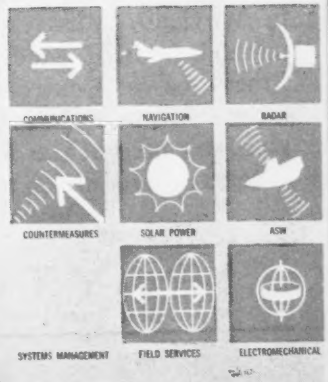
Experience, knowledge and skill provide Hoffman with a unique capability in systems management.



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Systems management capability of this magnitude, plus highly developed technical support (documentation, product assurance, installation, training and logistics) assures Raytheon customers on-time delivery of the most complex heavy electronic systems.

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RAYTHEON COMPANY

EQUIPMENT DIVISION

RAYTHEON

This DoD client now has re-start capability — the first

forty-nine, including officers and directors. The roster is seen on page 106.

As the fifteenth annual meeting broke up and the registrants made ready to return to their homes, the watchword was **"See you in Las Vegas."** The **1962 Convention,** plans for which are already under way, will be held in that city on September 19-23.

° ° °

In the past three years, the **Ak-Sar-Ben Squadron** of Omaha, Neb., has been engaged in a campaign to obtain community approval and support for a new commercial aviation facility. On September 2 and 3, the long and sometimes bitter struggle came to a successful conclusion, with the formal dedication of **Eppley Airfield Terminal.** The building was constructed at a cost of almost $4 million. Dignitaries on hand for the dedication made Omaha the capital of the aviation world for the week end.

Arthur C. Storz, founder of AFA's Squadron in Omaha, instigator of several additional units, member of the board of directors, and holder of just about every AFA award available, led the fight for the terminal. A plaque dedicated to him was installed in the passenger waiting room (*see cut*). One man who praised Storz's contributions is **Maj. Gen. Melvin Maas,** USMC (Ret.), who helped select the site for what became Eppley Airfield. He said, "Without Art Storz, Omaha would still be a whistlestop in the air transport field."

While Storz is the unquestioned leader in Omaha of activities relating to AFA's mission, we think it important to mention that in every effort, full credit is given to AFA, and particularly to the activity of the Ak-Sar-Ben Squadron. The special SAC anniversary dinner held on September 2, in connection with the dedication, was sponsored by the Squadron. The guest list at the function, held in the Sheraton-Fontenelle Hotel, was impressive.

In all its activities, the Ak-Sar-Ben Squadron is excellence personified. AFA is proud to salute this fine unit as Squadron of the Month for November in recognition of its outstanding effort.

° ° °

A new and interesting competition has come into being within AFA. We hope it continues. It's healthy for the Association.

At the 1960 national Convention, organizers of the then-still-to-be-chartered **Riverside, Calif., Squadron** turned in its Charter application with a total of 339 signatures, topping the old record held by **Tucson Squadron** with 333. At the 1961 meeting in Philadelphia, a group of **Texans from Fort Worth** showed up with a Charter application totalling 364 names, making this the largest Charter roster in AFA's history.

Phil North, vice president of the Fort Worth *Star-Telegram,* is the Squadron commander. He headed the delegation from the newest unit. He was accompanied by **Joe Shosid,** Squadron secretary, and other members. **Fred Korth,** president of Continental National Bank, was elected vice commander, and **Arch H. Rowan, Jr.,** treasurer.

Even before the Charter was approved, this outfit was planning a big community banquet, as a farewell

(Continued on following page)

Arthur C. Storz, with plaque in Omaha airport terminal building (*see text*).

SQUADRON OF THE MONTH

Ak-Sar-Ben Squadron, Neb., cited for

outstanding accomplishment of the basic aims of the Air Force Association, and effective community representation in the Omaha Area.

New Fort Worth officers (*see text*) are Phil North and Fred Korth, seated, and Arch H. Rowan, Joe Shosid, standing.

Miss Ruby Brothers, recipient of Ohio Wing's 1961 Airpower Award, shown with Wing Commander Morris Ribbler and Dayton Air Force Depot Commander Brig. Gen. William H. Veal. The award was made for outstanding airpower efforts.

Massachusetts Commonwealth Attorney General Edward J. McCormack, Jr., presents State Flag to Boston Squadron Cmdr. L. F. Musco. Wing Cmdr. Joseph S. Ayoub looks on.

Orange County Squadron dinner meeting in September (*see text*) featured Maj. Gen. Orvil Anderson as guest speaker. He is shown, second from left, with the Squadron officers.

party for **Maj. Gen. Nils Ohman,** commander, 19th Air Division (SAC), who recently was transferred. The program turned out to be a resounding success. If present activities are an indication, the **Fort Worth Squadron** is going to be a top-notch unit. We're proud to welcome it to the ranks of AFA outfits.

• • •

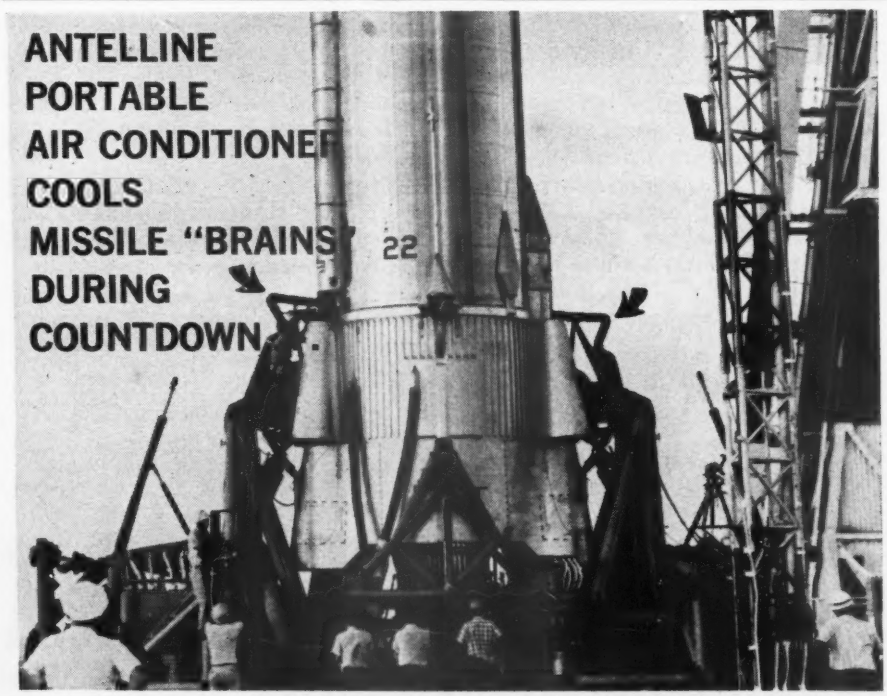
Maj. Gen. Orvil A. Anderson, USAF (Ret.), executive director of the Air Force Historical Society, was guest speaker at the September meeting of California's Orange County Squadron (*see cut*). Squadron commander **Ed Van Allen** was in charge of arrangements. General Anderson spoke on the menace of communism. He was co-winner of AFA's Arts and Letters Award at the Convention.

CROSS COUNTRY. . . . AFA's new Squadron in Louisville, Ky., held its Charter Night on September 8 at the University of Louisville. **Brig. Gen. Felix L. Vidal,** commander, 2d Air Force Reserve Region, was guest speaker. **Warren D. Volmer,** Squadron commander, was in charge of the program.

Tucson, Ariz., Squadron, in cooperation with the **Rotary Club of Tucson,** sponsored a special luncheon program on September 13, at which **Gen. Bernard A. Schriever,** commander, Air Force Systems Command, was guest speaker. In charge was **Frank R. Perier,** Tucson commander.

General Schriever is also guest speaker for **California's 1961 Mid-Year Conference Banquet,** at Pasadena's Huntington Hotel, November 4. The weekend will also feature observance of the **fiftieth anniversary of the first transcontinental crossing** of the US by air in 1911. **Lt. Gen. "Bill" Irvine, USAF (Ret.),** Pasadena Squadron commander, is host for the event, which promises to be one of the largest mid-year meetings in history, and a major aviation event in Southern California. **Gill Robb Wilson** will keynote the banquet.—END

Beginning this month, the AFA unit selected as "Squadron of the Month" will receive a set of three-by-five-foot flags—the national colors and an Association banner. They will be presented through the courtesy of the General Dynamics Corporation.



Countdown activity at an Atlas launching pad at Cape Canaveral, illustrating Antelline portable pod coolers attached and operating.

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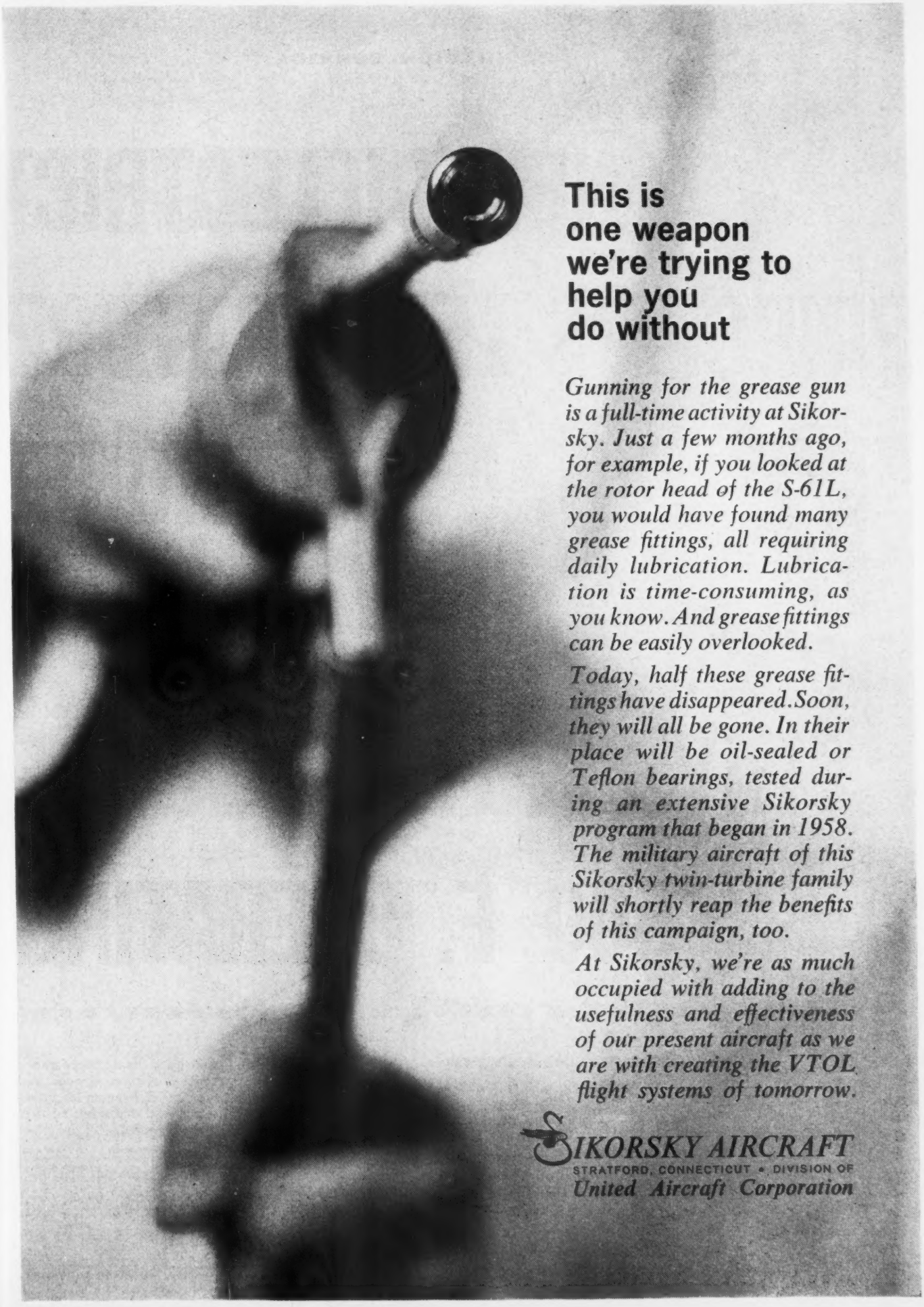

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Gunning for the grease gun is a full-time activity at Sikorsky. Just a few months ago, for example, if you looked at the rotor head of the S-61L, you would have found many grease fittings, all requiring daily lubrication. Lubrication is time-consuming, as you know. And grease fittings can be easily overlooked.

Today, half these grease fittings have disappeared. Soon, they will all be gone. In their place will be oil-sealed or Teflon bearings, tested during an extensive Sikorsky program that began in 1958. The military aircraft of this Sikorsky twin-turbine family will shortly reap the benefits of this campaign, too.

At Sikorsky, we're as much occupied with adding to the usefulness and effectiveness of our present aircraft as we are with creating the VTOL flight systems of tomorrow.

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410	0.87	1.30
400	0.90	1.35
0	60	125
-10	80	170
-20	110	260
-30	160	380
-40	240	650
-50	400	1030
-60	700	1800
-65	934	2600
-80	2780	—

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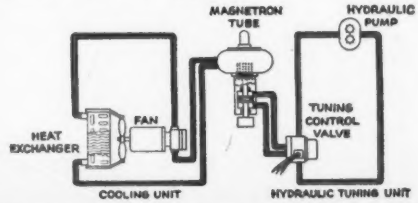

Here's how COOLANOL cools, lubricates, and hydraulically actuates a magnetron and tuner.

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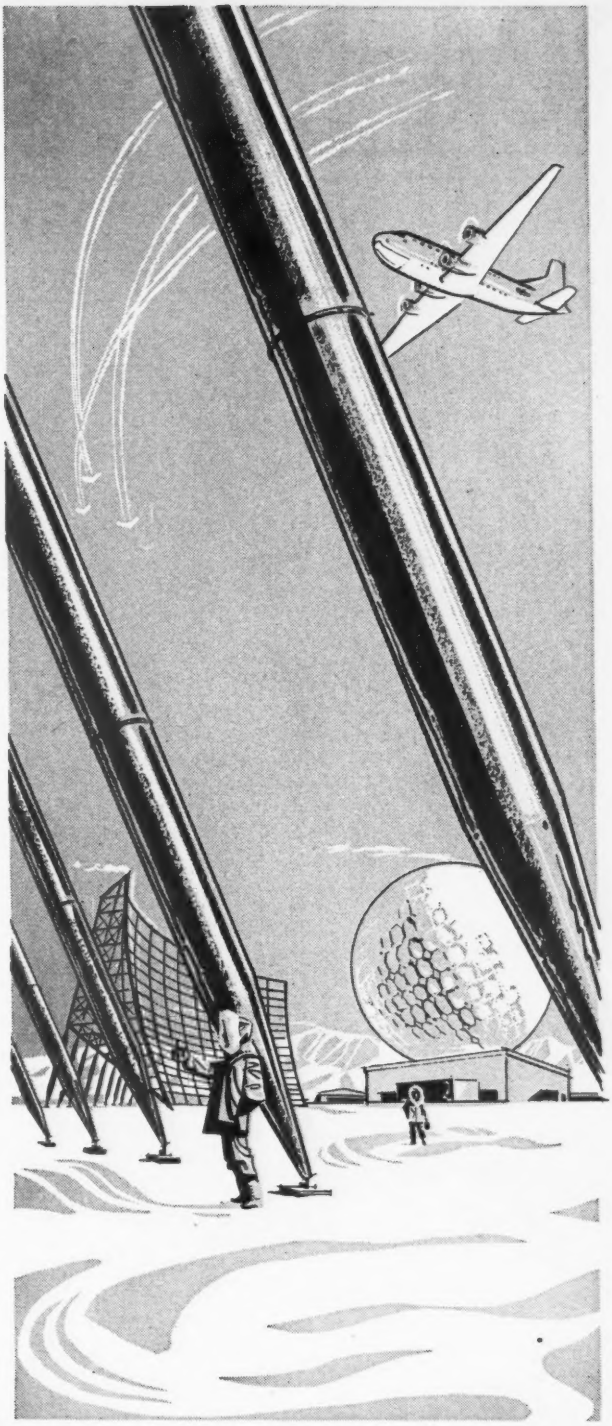

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Specific Gravity, 25/25°C.	0.889
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Thermal Conductivity, 25°C. (cal./sec. cm^2 °C. cm)	29.1×10^{-5}

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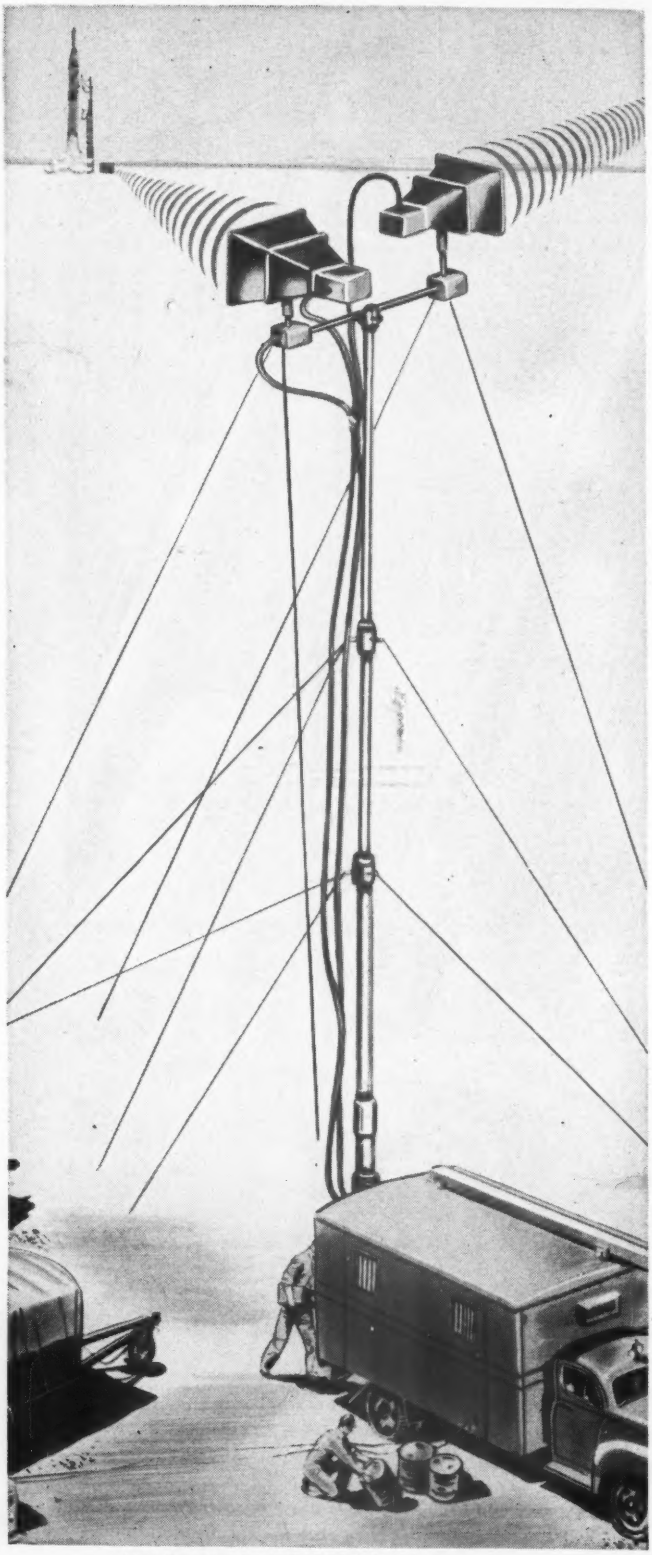
RCA Mobile Microwave



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TECH TALK

J. S. BOTZ, JR.

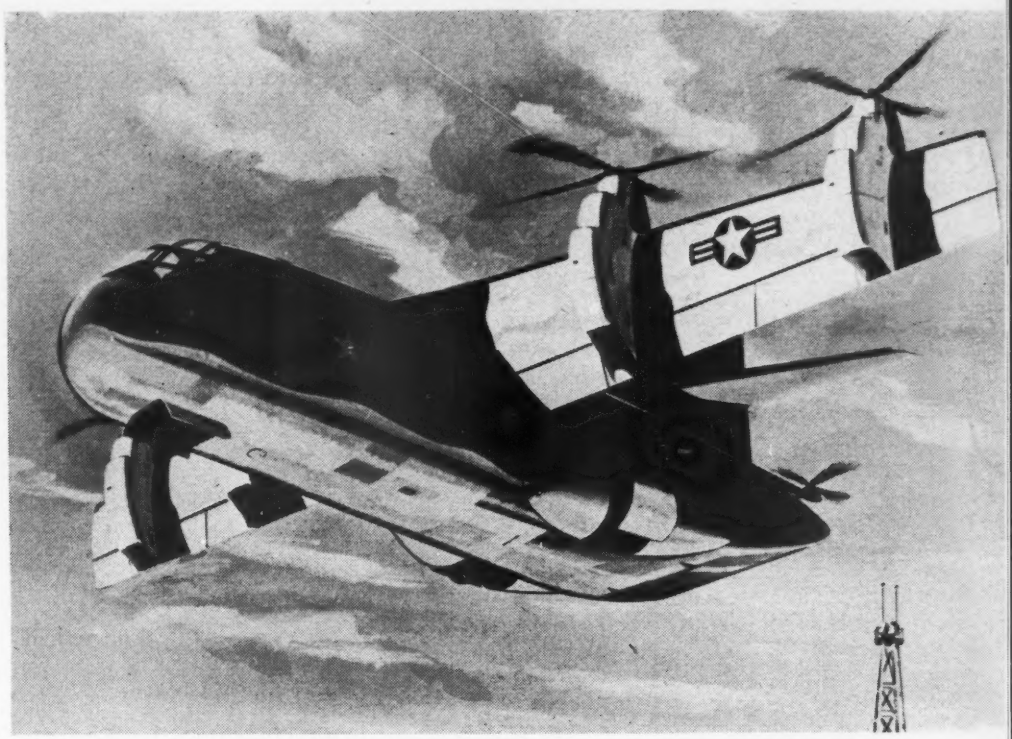
The **Department of Defense** has selected an industrial team of **Ling-Temco-Vought, Ryan Aeronautical Co.,** and **Hiller Aircraft Corp.** to design and construct a fifty-eight-foot-long VTOL transport to be used by all three services. The **Air Force** has been named manager of the triservice project.

Five of the new aircraft will be built under a contract which provides **$21 million from fiscal year 1961 and 1962 funds.** Total cost of the development program is expected to be around **$100 million.** The **Army, Navy,** and **Air Force** will share the expenses equally.

The tilt-wing-plus-flap principle will be used to give the transport its vertical-flight capability. This design concept combines the **best features of two types of VTOL research airplanes** that were tested extensively during the 1950s—the **simple tilt wing** and the **deflected slipstream** aircraft.

Testing has shown that tilt-wing airplanes, such as the **Hiller X-18,** were **very efficient in vertical flight** because their propellers were directed toward the ground. However, the wing had stalling problems as it tilted forward during the transition from vertical to horizontal flight. In contrast, **deflected slipstream aircraft,** such as the **Ryan VZ-3,** are not considered to be practical for operational VTOL use because they suffer a large thrust loss when the flaps turn the slipstream ninety degrees toward the ground. The large flaps on the VZ-3 did prove to be effective in **preventing wing stalling during transition.**

The combination of the **tilt wing** and **large, Fowler-type flaps** is considered to be more efficient today than the ducted fan or tilting rotor or other devices which might be used on high-speed VTOL aircraft.



Artist's conception above shows the USAF-managed, triservice VTOL transport rising vertically with its wing tilted upward and its large flap fully retracted.

Four **General Electric T64 turboprop engines** totaling about 11,200 eshp will power the new transport and give it a top speed of around **400 knots at sea level.** Cruise speed with a full payload of thirty-two equipped troops is estimated at better than **250 knots.** Normal operating radius is **200 to 300 nautical miles.** Maximum gross weight of the aircraft will be more than 35,000 pounds, but it will not be able to operate at this weight or with a maximum payload as a VTOL aircraft. The VTOL payload will be substantially less to ensure that the **loss of an engine during vertical takeoff will not cause a crash.** During STOL or short-takeoff-and-landing operations the aircraft will be able to carry a full payload out of a field less than 1,000 feet long.

One of the main missions of the triservice transport is to provide, for the first time, **definite information on the problems of operating VTOL aircraft in the field.**

* * *

Research on new types of VTOL aircraft **has not been ended** with the selection of the **tilt-wing-plus-flap design for the triservice transport.** A small airplane using two **General Electric lift-fan engines** will be built for the Army by Ryan. This is the first time that an **engine contractor has been named prime contractor** on an airplane project.

The aircraft's lifting power will be provided by **two fans in the wing producing a total of 14,860 pounds of vertical thrust** plus a small stabilizing fan in the nose. During forward flight the hot gas from two J85 turbojets, which drives the fan system, **will be diverted to normal jet exhaust to deliver a total horizontal thrust of 5,160**

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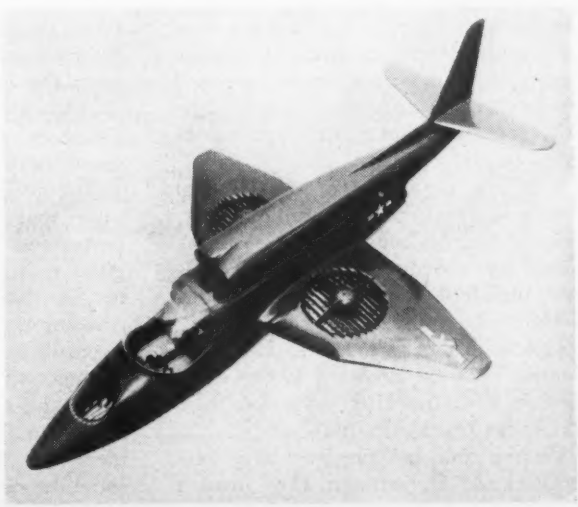
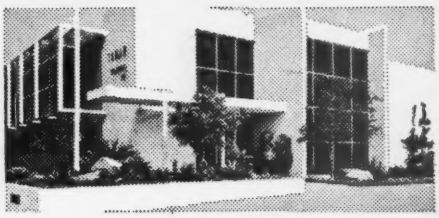


The General Electric lift-fan concept will be tested in the Army-sponsored research aircraft to be built by Ryan within twenty-four months.

TAMAR
SIR



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Republic's plasma engine is shown in vacuum test facility. It probably will be flight tested in space early in 1962.

pounds. Top speed of the airplane will be around 450 mph, and it is to be ready to fly within two years.

* * *

High-performance electric engines for space use are nearing the flight-test stage in the United States.

A plasma engine, in which an electrically neutral flow of high-temperature nitrogen is electromagnetically accelerated to very high velocities, has been produced by Republic Aviation as a joint project between the company, the Office of Naval Research, and the USAF Office of Scientific Research. Extensive tests have been performed with the engine in vacuum facilities at the electrical and advanced propulsion branch of the Aeronautical Systems Division at Wright Field. Current plans call for a "flyable" model to be ready for launching into space early next year.

Another new engine, an ion device, has been developed by Hughes Aircraft under NASA contract. In the ion engine, cesium vapor is ionized and the positive particles are electrostatically accelerated to a very high velocity to provide thrust.

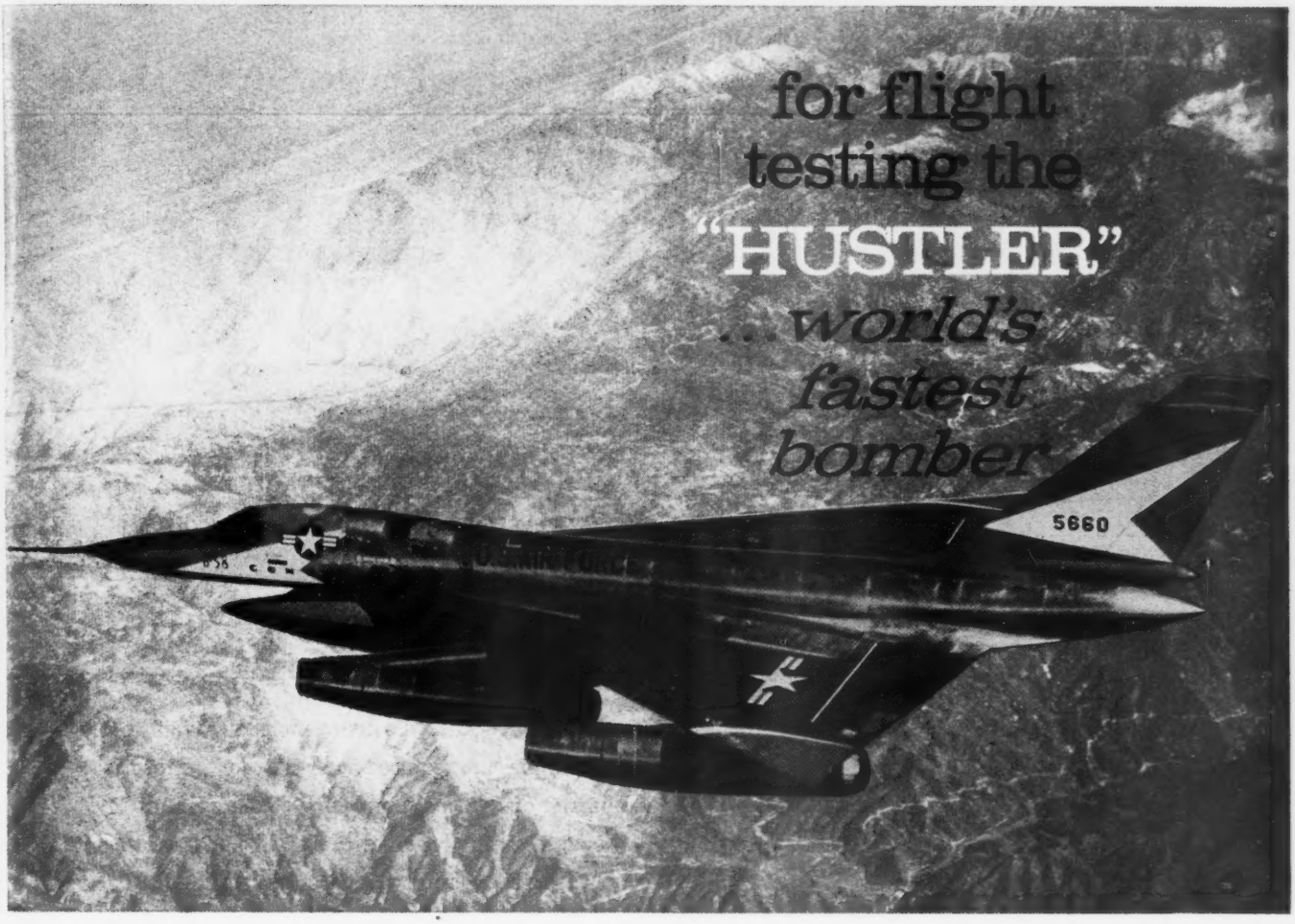
The first flight test of the Hughes engine is scheduled for late next year, when it will be boosted from Wallops Island by a Scout rocket to an altitude of 5,000 miles for a spaceflight of about one hour. Another ion engine, designed at NASA's Lewis Research Center, is to be enclosed in the same capsule with the Hughes powerplant and flight tested simultaneously.

Plasma and ion engines have one requirement in common, they need a

Ion engine above has been developed by Hughes Aircraft under NASA contract. It will be flight tested next year.

strong, steady source of electrical power to keep them operating. During flight tests next year, the Hughes ion engine will run off chemical batteries during its brief flight, and the Republic engine will derive its power from the sun to allow a longer test. A large array of solar cells will continuously charge the batteries that store energy for the engine.

Theoretical studies have shown that some space missions probably can be performed more efficiently by ion engines and some will be handled better by the plasma powerplant. Fuel consumption probably will be about twenty-five percent lower on the ion engine and it will be better for long space missions. The plasma engine has a much wider thrust range and is ideal for the slow maneuvering of satellites near the earth.—END.



Convair uses DORSETT Telemetry Equipment

MACH 2-PLUS SPEEDS and service ceiling above 60,000 feet are just two in literally hundreds of radically new innovations Convair/Fort Worth engineers specified for the Air Force B-58 . . . already holder of many world speed records!

Yet, each unique device was already a proven unit, from the J-79 jet engines to the bonded-sandwich wing panels. Despite such fantastic demands, Convair flight-tested the first "Hustler" just *26 months* from release of engineering drawings!

Test schedules for this unprecedented assembly of "new" components require unquestionable accuracy in telemetering equipment. Dorsett, a major supplier of subcarrier oscillators to Convair/Fort Worth for over four years, filled (and continues to meet), the requirements for as many as 500 subcarrier oscillators per test plane! The Dorsett Model 0-3 is used in pre-assembled multiple unit banks. The Dorsett Model 0-28 transistorized voltage controlled oscillator is used for special test situations.

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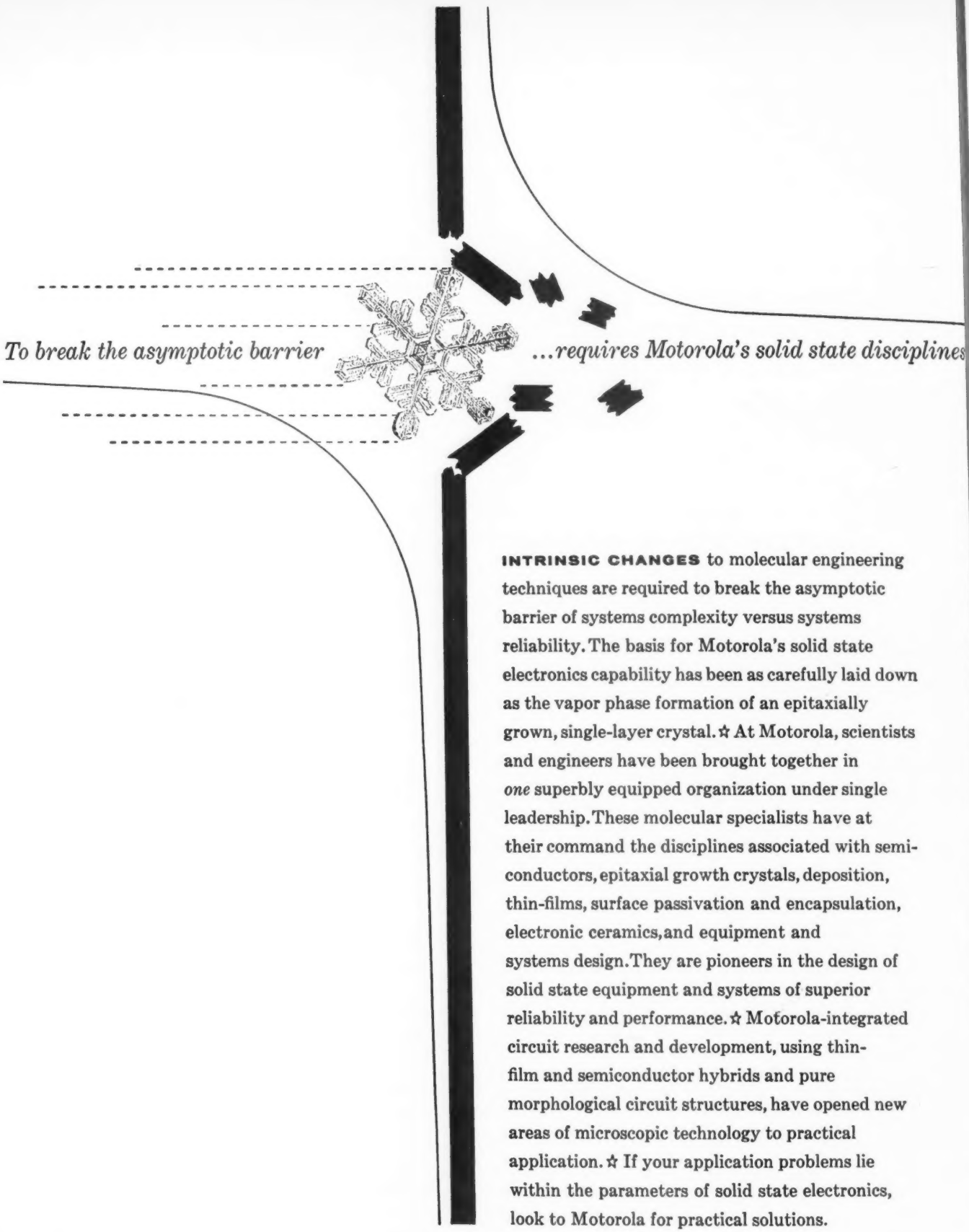

INTRINSIC CHANGES to molecular engineering techniques are required to break the asymptotic barrier of systems complexity versus systems reliability. The basis for Motorola's solid state electronics capability has been as carefully laid down as the vapor phase formation of an epitaxially grown, single-layer crystal. ☆ At Motorola, scientists and engineers have been brought together in *one* superbly equipped organization under single leadership. These molecular specialists have at their command the disciplines associated with semiconductors, epitaxial growth crystals, deposition, thin-films, surface passivation and encapsulation, electronic ceramics, and equipment and systems design. They are pioneers in the design of solid state equipment and systems of superior reliability and performance. ☆ Motorola-integrated circuit research and development, using thin-film and semiconductor hybrids and pure morphological circuit structures, have opened new areas of microscopic technology to practical application. ☆ If your application problems lie within the parameters of solid state electronics, look to Motorola for practical solutions.

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In recognizing these services that are rendered by insurance programs, AFA not only attempts to make them available to members but also keeps its programs under constant review, making revisions and changes as they are deemed necessary. The latest example of this never-ending review program is the new *all*-accident insurance program which has replaced the former policy covering only travel accidents. This and other programs are briefly described below.

All-Accident Insurance

This new program, available to all AFA members, offers full twenty-four-hour protection against all accidents, regardless of how or where they occur. It is offered in units of $5,000 up to a maximum of $50,000 and is available either singly or in the popular new family plan at unbelievably low rates.

Coverage under the family plan provides insurance for each member of the family, under one policy. Under this plan the wife of the policyholder is insured for 50% of his coverage and each child, regardless of number, is insured for 10% of his coverage.

Coverage is also provided for nonreimbursed medical expenses of over $50, up to a maximum of $500. Under the family plan each member of the family is provided this extra coverage. In addition, policyholders receive an automatic 5% increase in the face value of their policy each year (at no increase in cost) for each of the first five years of coverage.

Life Insurance

AFA Group Life Insurance is available to all active duty officers and NCOs of the first three grades. It provides a graded amount of coverage, with a top amount of $20,000, depending on age and flying status. The death benefit is increased by 50% of the policy's face value if death is caused by any kind of accident.

As an additional benefit policyholders may keep their insurance in force at the low group rate after they leave the service, provided their coverage has been in effect for more than a twelve-month period immediately prior to the date they leave the service.

Flight Pay Insurance

Guaranteed flight pay protection is available to rated personnel on active duty. Protection is guaranteed, even against pre-existing illnesses, after a policy has been in force for more than twelve consecutive months. This plan was first introduced in 1956 and since that time AFA has paid more than $1,800,000 in claims. Each month checks go to between 100 and 150 grounded flyers.

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- ☐ Group Life Insurance
- ☐ Flight Pay Insurance

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airman's bookshelf

USAF in Korea: The Definitive History

***The United States Air Force in Korea, 1950-1953*, by Dr. Robert F. Futrell (Duell, Sloan & Pearce, 1961, $12.50)**

Reviewed by Maj. James F. Sunderman, USAF Chief, USAF Book Program

Long awaited in professional military air circles, this is the official, definitive, analytical-interpretive history of USAF in the Korean War.

Here in bold relief, for all but those who would knowingly blind themselves to fact, is a profile study of how modern air forces were successfully employed in limited war against Communist military aggression.

During the first months of seesaw hostilities, UN air forces quickly knocked the North Korean air forces from the skies, gaining control of the air over all Korea and held it throughout the war. Without air protection and support, the North Korean Army was dislodged from strong positions ringing Pusan by a driving, devastating air-ground offensive, and driven northward all the way to the Yalu River in disorganized condition. It was almost completely decimated. Large portions of whole divisions of retreating men and equipment were wiped out by fighter, fighter-bomber, and light bomber attacks, paving the way for the rapid advance of UN ground forces northward.

The complete collapse of the North Korean Army marked the entrance of the Chinese Communists into the war. The Chinese Reds poured across the Yalu bridges in force from Manchuria. A new war was now under way.

The next two years saw the emergence of an air strategy employed to attain the UN's limited objectives of conflict—"favorable truce terms" rather than victory. While ground forces held the line roughly along the thirty-eighth parallel, airpower was directed north to the Yalu River to prevent an enemy logistical and personnel build-up, and to apply the UN's primary offensive military pressure. These things UN aircraft did with spectacular success in a round-the-clock, day-after-day offensive against rails, roads, bridges, supply and ammo dumps, troop concentrations, and front-line positions. The enemy found it almost impossible to move by day. Only a fraction of needed supplies found their way at night.

The fact that never, in the last two years of the war, did the enemy succeed in mounting a major ground offensive is a tribute to the effectiveness of the round-the-clock interdiction. Conservative figures of enemy losses during this period are: vehicles—75,000; locomotives—1,000; railroad cars—16,000; bridges—2,000; rail cuts—27,000; barges and boats—600; troops—28,000; tanks—300; gun positions—12,000; bunkers—15,000.

Meanwhile F-86 Sabrejets, on patrol along the Yalu, met and defeated in air-to-air combat the highly-touted Russian MIG-15s at ratio of fourteen to one. Communist airpower was never able to penetrate south to the bombline. "Freedom from air attack" allowed unlimited UN troop deployment. A flight over the bombline at night pointed out with stark impact what this control of the air meant. On the UN side, trucks traveled the winding roads with headlights glaring, and camp lights sparkled in every direction. Open-air movies entertained the soldiers. On the enemy side, nothing but unbroken darkness of the Korean night enveloped the misty hills.

It was in the latter part of the war that real air pressure was finally applied. It forced the Communists back to the truce table. Massive strategic air strikes, such as those on dams in the north, mortally wounded elements of the North Korean economy. It must be remembered that the Communist aggressors *asked for* the truce negotiations to be resumed *only after* these significant strikes, which the UN had not permitted heretofore, were successfully accomplished. It must be remembered also that the final truce terms were in accord with the UN objectives of the war.

It is impossible here to delve into more than fragmentary aspects of the war which author Futrell—the Air Force Historian, Pacific Theater—covers in a comprehensive manner. Dr. Futrell devoted years to this work. It divides into twenty chapters, from "The First Six Days of Communist Aggression" to "Air Mission Accomplished"—the truce which brought hostilities to an end. It covers every chronological development, including activities of Marine, Navy, and other UN air units.

Here, in short, is a very important book, a book that is absolutely *must* reading for professional airmen and others concerned with military problems in the world today. This is a truly worthy historical work.

The United States Air Force in Korea is the Fall, 1961 selection of the AeroSpace Book Club.

NOTE: Any book reviewed in Airman's Bookshelf may be obtained, postpaid, from the AeroSpace Book Club, 1901 Pennsylvania Ave., N.W., Washington 6, D. C. Full payment must accompany order. Information on the Book Club may be obtained from the same source. Club members are eligible for substantial savings on Club selections.

Here Come the Sweeneys!

***Sweeney Squadron*, by Donald J. Plantz (Doubleday & Company, Inc., 1961, 280 pp., $3.95)**

Reviewed by Dr. Frank W. Anderson, Jr. Managing Editor, The Air University *Quarterly Review*

Sweeney Squadron is an excellent fictional analysis of the luck and guts and leadership of a fighter squadron in World War II. The squadron in question is one of three in a new group formed in Florida in 1944 as part of the First Special Air Group. With its leadership largely composed of tried combat pilots, this group is hand-picked for combat operations in P-51 Mustangs. Yet through one of the quirks of military bureaucracy it has been decided that the three hand-picked squadrons must be reduced to two.

Maj. Everett Gregory, commander of the First Squadron and veteran of the European air war, is rebellious at the thought that a training program must also become an elimination contest. But contest it is, and his squadron seems to be running hard for last place. As one of his flight leaders puts it, their flight maneuvers give the impression of a bunch of guys accidentally going in the same direction.

Into this depressed atmosphere is injected the further problem of the first fatality—a young, inept pilot who crashes when he panics on a night landing. The subsequent investigation by officials of the Training Command is conducted like a political inquisition and completes the rout of the squadron's morale. In a gesture of defiance Major Gregory gives his squadron the

(Continued on page 123)

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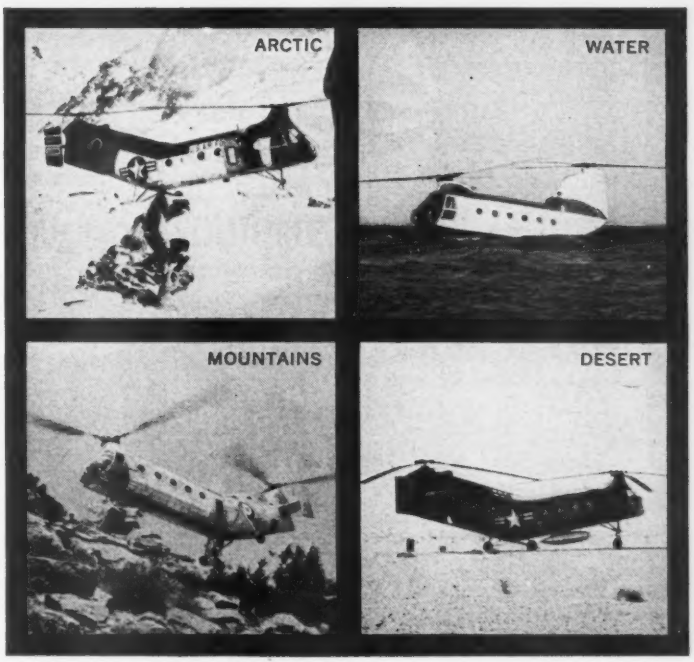
Proved thus far in more than 260,000 hours of accumulated service, the Boeing Vertol steel spar rotor blades have demonstrated excellent performance under difficult conditions in many places. Greenland, Labrador, Alaska, Northern Canada, the Sahara Desert and Far East jungle operation have proved the blades in a broad spectrum of temperature, erosion and corrosion environments. The steel spar rotor blades, incorporating latest state-of-the-art advances, are furnished as standard equipment on the versatile Boeing Vertol 107. They provide all-weather dependability and long life, with interchangeability that simplifies spares provisioning, maintenance and overhaul.



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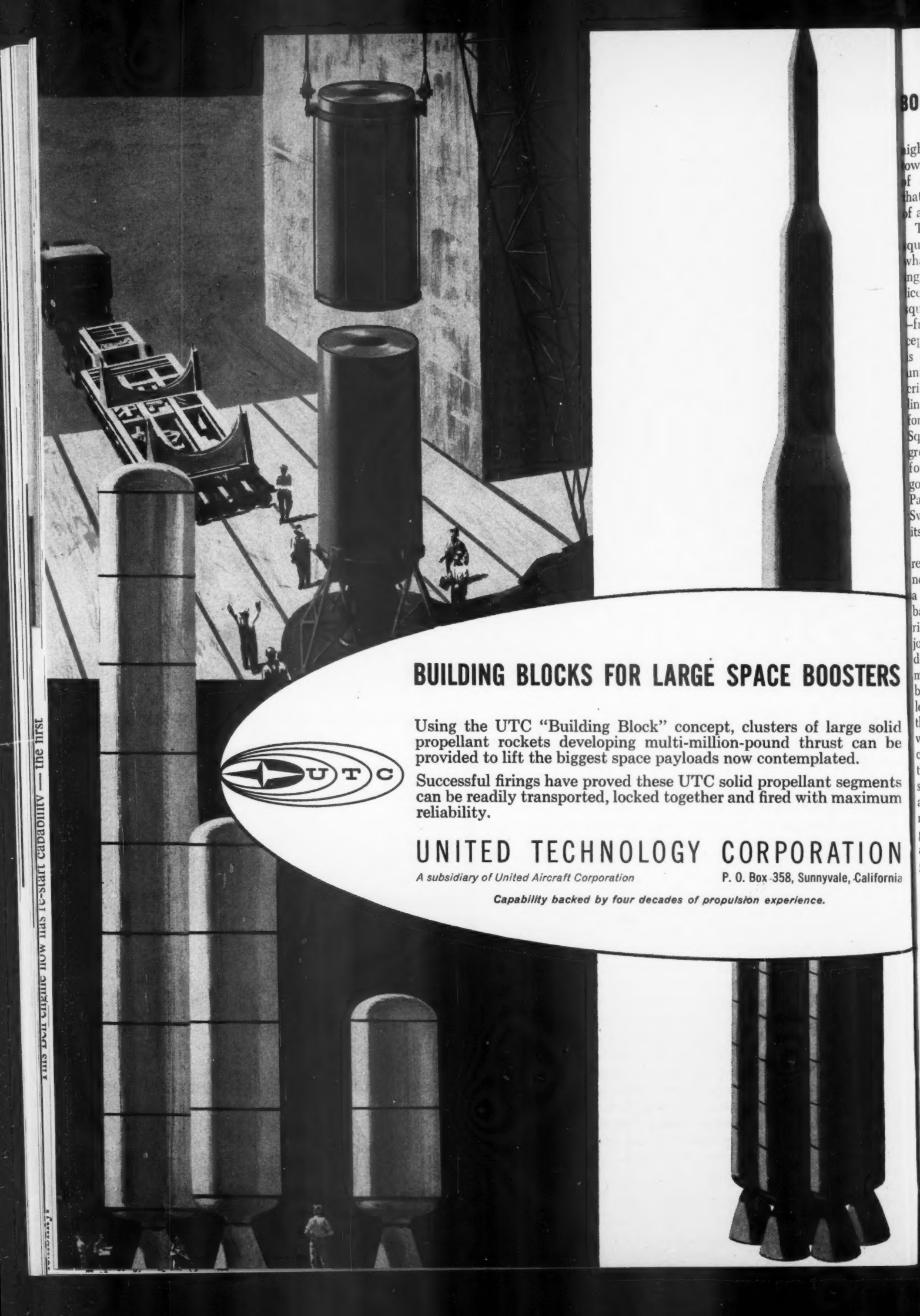
BUILDING BLOCKS FOR LARGE SPACE BOOSTERS
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night off in the little adjacent Florida town of Palmetto—in open defiance of a Training Command regulation that prescribed no more than one-third of a unit on pass at one time.

This marks a turning point for the squadron. The noncoms, realizing what the squadron commander is risking, rally around on their own to police the night's activities. Also the squadron gains its nickname that night—from the squadron commander's perceptive girl friend. The next day there is the beginning of a new sense of unity and purpose. Formations are crisp and purposeful; servicing on the line is fast and effortless. Sick call is for the sick. Needless to say, Sweeney Squadron becomes the point of the group. Another squadron is selected for disbanding. When the group goes into combat in the Southwest Pacific, the same results apply. Sweeney Squadron becomes a legend, its *esprit de corps* a model.

As with any good book, such a resumé is a gross injustice. The richness in Sweeney Squadron is not only a grasp of the subject matter—air combat—but the proving out of this in the richness of personal relationships. Major Gregory has his troubles up and down the line—with the group commander, with the Training Command brass, with a trigger-happy flight leader, with the diseases and snafus of the Southwest Pacific. Sometimes wrong, sometimes pigheaded, he still comes up in the clutches with what the author seems to consider the essence of combat air leadership—flair and luck. There may be other formulas, but the author makes out a good enough case for his to provide arguments in many an old-soldiers' get-together.

This is core subject matter for people concerned with airpower. It is handled as a good yarn, yet with insight and depth.

Abuse of Publicity

***Secrecy and Publicity*, by Francis E. Rourke (The Johns Hopkins Press, 1961, 227 pp., $5, Indexed)**

Reviewed by Claude Witze
Senior Editor, AIR FORCE/SPACE DIGEST

The task of conveying the Washington atmosphere to our readers in USAF and the aerospace industry seldom gets the kind of help offered here by Francis E. Rourke. His book, concise and detached, is required reading for anyone who may appear as a witness before a congressional committee. A congressional witness from industry who has not prepared himself by reading it will be derelict in his responsibility to the military-industry team.

The secrecy side is interesting but less important than Mr. Rourke's discussion of publicity and how it is used and misused. As a reporter and contemporary of Jim Hagerty, I never have been able to understand events surrounding the U-2 affair, in which the press and the public were deliberately deceived by their own government. That Mr. Hagerty, who came out of the newspaper business and is the son of a highly ethical reporter, would lend himself to this fraud was shocking. That a news medium, even radio, would accept him back with professional stature, is depressing. Mr. Rourke says the incident may be the exception rather than the rule but he warns there may be more cases as military and diplomatic affairs become increasingly important in what we hope is a healthy democracy.

It is the abuse of publicity that is germane to the military-industry team responsible for national security, and it is the most important part of Mr. Rourke's book. The spotlight is on Congress. There is a liberal education in his arrangement of the facts to

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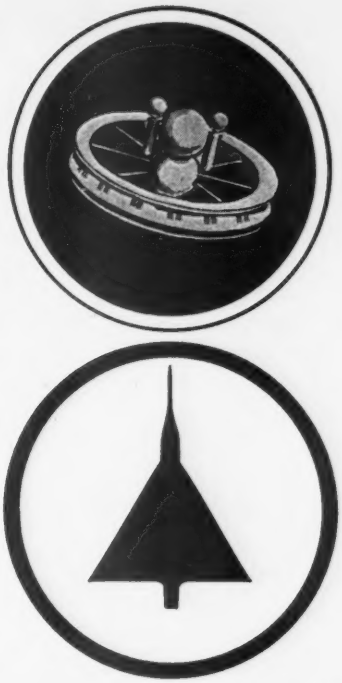

Is Your Oxygen Breathing System As Good As It Can Be?

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BREATHING LIFE INTO AIR AND SPACE TRAVEL

show that Congress is itself to blame for a lot of secrecy in government and that it is guilty of invoking punitive sanctions against innocent people with the abuse of publicity.

The pattern should be familiar to you. Representative Snort may come from a district in mid-Manhattan or the cornfields of Iowa, where defense industry is as remote as wild penguins. But he will take off on some ill-supported charge to prove that the military and the industry are in cahoots to swindle the taxpayer. He will tell Jack Iron, a reporter-columnist, about thes evils and how he intends to bare ther to the public and make the combin purge itself. Jack Iron writes the stor and it is spread from coast to coas The hearing is held, Snort is show to be wrong. Jack Iron is not presen at the hearing, of course, and hi thousands of readers go on believin that the congressman is a hero.

Mr. Rourke says that the recen upsurge in congressional investiga tions primarily reflects an attempt o the part of the legislature to restor a balance of power (as opposed to th White House) in the area of pub licity. No aspect of congressional ac tivity other than investigations is a capable of attracting the attention o the public and the communication facilities that both direct and reflec public interest.

The author makes it clear that con gressional blocs can and do use probe to inflict public embarrassment on pri vate institutes and individuals. This means that the witnesses, who can be military or industry spokesmen, are put on the defensive, "a posture from which full recovery before the bar of public opinion is often very difficult to attain."

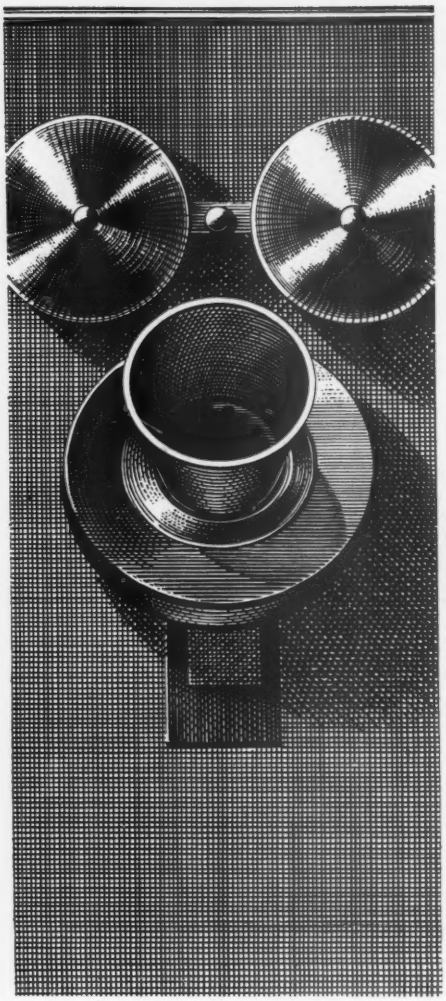
Of course, it is fair to say that we lament these tactics when they are used to pillory innocent men, as they were by Joe McCarthy, and that we are inclined to approve them when the victim is some unsavory character out of the underworld or a parasite with a job in television. Here, Mr. Rourke, suggests, the responsibility rests with the journalists. It would seem that it is up to the press to make sure publicity does not accomplish anything that the courts could not accomplish. This cannot be done by rewriting committee press releases.

• • •

Air Force Lt. Col. Grover Heiman, former SAC Fifteenth Air Force information officer, has written a novel of KC-135 operations and the crewmen who perform the aerial refueling of SAC global bombers, worldwide. *Jet Tanker* (Dodd, Mead, $3.50), is sketched against an authentic background of SAC training. It is aimed principally at the young adult.

• • •

This Was Your War, edited by Frank Bookhouser (Doubleday, $4.95). One hundred selections from America's best wartime literature. Authors include Ernie Pyle, Drew Middleton, Herman Wouk, James Michener, MacKinlay Kantor, John Hersey, John Steinbeck.—END



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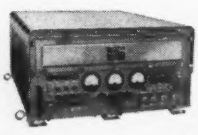

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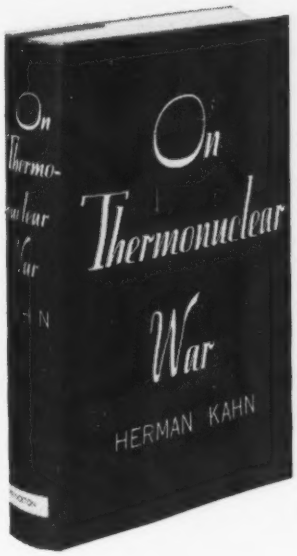

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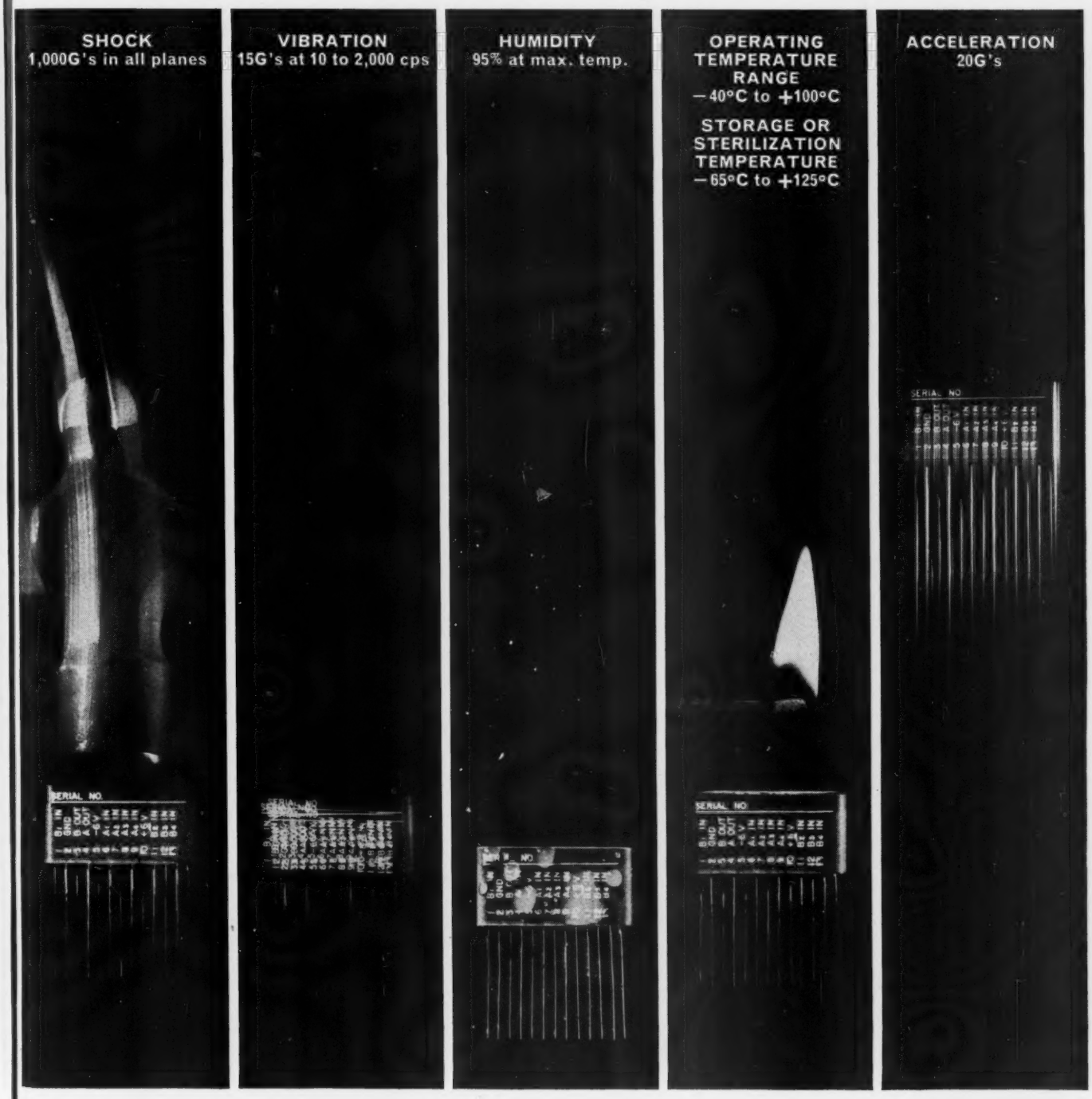

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